2016 GUIDE TO CROP PROTECTION

For the chemical management of weeds, plant diseases and insects

Introduction

Weed Control

Foliar Fungicides

Seed Treatments

Insect Control

This publication is only a guide intended for the use of Saskatchewan growers. Always refer to the product label for application details and precautions. If information in this publication conflicts with the label, use label directions.

Government of Saskatchewan

Saskatchewan Ministry of Agriculture

Spring Update: An update to this publication is produced for May 1 of each year to provide corrections and new uses that have been registered since printing. The spring update to the Guide to Crop Protection is available through Saskatchewan Agriculture Regional Offices, the Agriculture Knowledge Centre or on the at www.saskatchewan.ca/agriculture. Your local dealer may also have copies available.

Saskatchewan Agriculture Regional Offices provides publications and personal service on a range of topics. Specialists in Crops, Forage, Livestock and Farm Business Management are available to assist you at the following Regional Offices:

Kindersley
306-463-5513

Moose Jaw
1-866-457-2377

North Battleford
306-446-7962

Outlook
306-867-5575

Prince Albert
306-953-2363

Swift Current
306-778-8285

Tisdale
306-878-8843

Watrous
306-946-3220

Weyburn
306-848-2857

Yorkton
306-786-1531

Appointments with specialists can also be booked at one of the following Regional Satellite Offices:

Assiniboia
1-866-457-2377

Estevan
306-848-2857

Lloydminster
306-446-7962

Meadow Lake
306-446-7962

Moosomin
306-786-1531

Shaunavon
306-778-8285

Wadena
306-946-3220

Agriculture Knowledge Centre **1-866-457-2377**

The Agriculture Knowledge Centre provides agricultural information and advice to farmers, ranchers and the agriculture industry on topics such as crop and livestock production; new research and technology; government programs and services; and farm business management. The Agriculture Knowledge Centre's resource agents and specialists are committed to providing expert technical information and excellence in client service.

Crop Protection Laboratory **306-787-8130**

The Crop Protection Laboratory offers a range of diagnostic services to assist in the identification of problems associated with all agricultural crops and forage. The major areas of expertise include weed, insect and plant disease identification and herbicide resistance screening.

A Crop Protection Laboratory submission form should be completed fully and included with each sample to provide important background information for a more accurate diagnosis. Crop Protection Laboratory submission forms and instructions on submitting samples can be found at www.saskatchewan.ca/agriculture and search "Crop Protection" or email croplab@gov.sk.ca for a full list of services and fees.

Pest Management Regulatory Agency (PMRA)
www.hc-sc.gc.ca/cps-spc/pest/index-eng.php

Information service (Ottawa)	1-800-267-6315
Regional Compliance (Saskatchewan)	(306) 780-7123

Agriculture and Agri-Food Canada (AAFC)

Saskatoon Research Centre	(306) 956-7200
Scott Research Farm	(306) 247-2011
Melfort Research Farm	(306) 752-2776
Indian Head Research Farm	(306) 695-5225

Pesticide Residue Analysis
(herbicide, fungicide or insecticide)
ALS Labs 1-800-668-8370
www.alsenviro.com

Additional Information

For more information on herbicides, pesticides, pesticide safety and weed, insect or plant disease control, consult the publications available from the Agriculture Knowledge Centre or visit the Saskatchewan Agriculture website at www.saskatchewan.ca/agriculture.

You can also find us on Twitter @SKAgriculture.

Major Poison Control Centres

Saskatchewan Health
1-866-454-1212

Saskatoon	**Regina**
Royal University Hospital	Regina General Hospital
(306) 655-1010	**(306) 766-4545**
1-800-363-7474	**1-800-667-4545**

Toxicology Centre

University of Saskatchewan
(306) 966-7441 or (306) 966-7442
tox.centre@usask.ca; www.usask.ca/toxicology

Spill Report

Saskatchewan Environment -
www.SaskSpills.ca
1-800-667-7525

This publication was prepared by the Saskatchewan Ministry of Agriculture in co-operation with Manitoba Agriculture, Food and Rural Initiatives, with the assistance of the Saskatchewan Weed Committee.

Weatheradio Canada

Weatheradio is a network of radio stations operated by the weather service of Environment Canada which transmits weather information continuously over VHF-FM radio. The service operates 24 hours each day, seven days a week, providing up-to-the minute weather forecasts and reports detailed to each broadcast area.

Weatheradio is transmitted from 13 locations in Saskatchewan:

- Estevan, Prince Albert, Stranraer, Regina Beach, Lanigan and Waseca on frequency 162.400;
- Regina, Swift Current, Yorkton and Saskatoon at 162.550 (Medicine Hat west of Maple Creek); and
- North Battleford, Lake Diefenbaker (Elbow) and Broadview at 162.475.

Pesticide Application Licensing

The Pest Control Products (Saskatchewan) Act and Regulations related to that Act require that any person who applies a pesticide for commercial purposes must have a valid applicator's licence.

To be eligible for a licence, appropriate training is required from the Agriculture Division of Saskatchewan Polytechnic.

Phone: 1-800-467-4278

Further details regarding licensing requirements can be obtained from the Crops and Irrigation Branch of Saskatchewan Agriculture. Visit www.saskatchewan.ca/agriculture and search for "pesticide licensing".

Phone: (306) 787-4662

Meteorological Service of Canada

Weather One-on-One Service

(charge to phone)	1-900-565-5555
(charge to credit card)	1-888-292-2222

Weather Information

Broadview	(306) 696-2229
Estevan	(306) 634-2833
Hudson Bay	(306) 865-2721
Lanigan	(306) 365-3011
Lloydminster	(780) 875-7709
Medicine Hat, AB	(403) 526-0483
North Battleford	(306) 445-7000
Prince Albert	(306) 929-2114
Regina	(306) 780-5744
Saskatoon	(306) 975-4266
Swift Current	(306) 773-5599
Whitewood	(306) 735-2928
Yorkton	(306) 782-1511

Severe Weather Reporting and Weather Awareness

Call toll free	1-800-239-0484

DriftWatch

In Saskatchewan, commercial beekeepers and producers with sensitive crop areas are encouraged to register locations on Driftwatch: https://sk.driftwatch.org/map. This tool is intended to aid identifying areas especially sensitive to pesticide drift for reference by commercial pesticide applicators.

www.fieldwatch.com; www.driftwatch.org.

Crop Protection Companies

ADAMA Canada
www.adama.com
1-855-264-6262

AgriStar
www.agri-star.ca
1-877-924-9378

Arysta LifeScience
www.arystalifescience.ca
1-866-761-9397

BASF
www.agsolutions.ca
1-877-371-2273

Bayer CropScience
www.bayercropscience.ca
1-888-283-6847

Degesch America Inc.
www.degeschamerica.com
1-800-330-2525

Dow AgroSciences
www.dowagro.ca
1-800-667-3852

E.I. DuPont Canada
www.dupont.ca/ag
1-800-667-3925

Engage Agro
www.engageagro.com
1-866-613-3336

Farmers of North America (AgraCity Crop & Nutrition)
www.fna.ca (www.agracity.com)
1-877-362-3276
(1-844-269-3276)

FMC Canada
www.fmccrop.ca
1-306-979-9225

Gowan Canada
www.gowanco.com
1-800-883-1844 ext. 2

Great Northern Growers
www.gng.ag
1-866-727-5226

Hedley Technologies
www.hedleytech.com
1-888-476-4473

IPCO
www.ipco.ca
(204) 233-3461

Loveland Products Canada
1-800-328-4678

Platform Specialty Products
1-800-423-8569

Monsanto
www.monsanto.ca
1-800-667-4944

Norac Concepts
www.noracconcepts.com
(519) 821-3633

Nufarm Agriculture
www.nufarm.ca
1-800-868-5444

Peacock Industries
www.grasshoppercontrol.com
(306) 225-4691

Syngenta Canada
www.syngenta.ca
1-877-964-3682

United Phosphorus Inc. (UPI)
www.upi-usa.com
1-866-287-9190

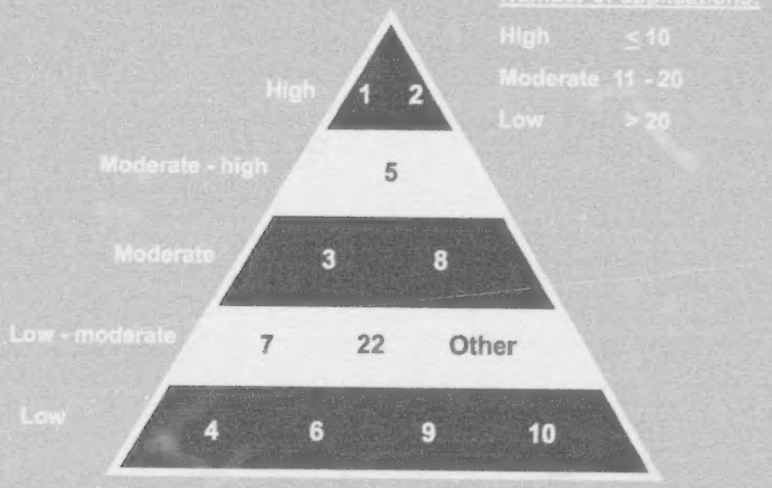
Valent BioSciences
www.valent.com
1-800-868-5444

HERBICIDE ROTATION - 2016

Resistance to a pesticide group will reduce the effectiveness of pesticides in that group over time. Rotation of herbicides and other pesticides is an important measure to delay the onset of resistance to any one pesticide group or mode-of-action.

By rotating herbicides, the risk of developing widespread resistance over a field drops. The illustration below gives a relative ranking of the risk of developing herbicide resistance from repeated use of herbicides from that particular resistance Group. The top of the triangle indicates groups that may develop resistance quickly. Those at the bottom of the triangle have demonstrated a low risk of resistance developing over long-term use. Be aware that low risk does not mean no risk, since weeds have developed resistance to herbicides in these groups as well.

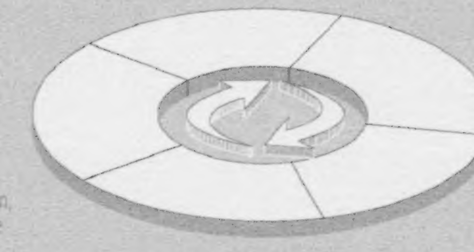
Herbicide Resistance Development Risk Based on Number of Applications



Classification of herbicide group numbers by risk of selection for weed resistance
("Other": all other herbicide groups that pose a low or moderate risk)
Adapted from Beckie, H. J., 2006 *Herbicide Resistant Weeds: Management Tactics & Practices*
Weed Technology Vol. 20 Issue 3 (July-September) pp. 793-814

Rotation of Herbicides to Prevent Resistance

See "Trade Names, Active Ingredients and Formulations" chart in the introduction chapter for a complete list of products containing these active ingredients.



OTHER GROUPS
linuron (7), amitrol (11), diflufenzopyr (19), diclobenil (20), quinclorac (26 - grassy weeds)

GROUP 1 (Grass Control)
clethodim, clodinafop, fenoxaprop, pinoxaden, quizalofop, sethoxydim, tralkoxydim

GROUP 2 (Grass & Broadleaf control)
ethametsulfuron, foramsulfuron, florasulam, flucarbazone, halosulfuron, imazamethabenz, imazamox, imazapyr, imazethapyr, metsulfuron, nicosulfuron, pyroxsulam, rimsulfuron, thiencarbazone, thifensulfuron, tribenuron

GROUP 3 (Grass & Broadleaf control)
ethalfluralin, Trifluralin

GROUP 4 (Broadleaf Control)
2,4-D, 2,4-DB, aminopyralid, clopyralid, dicamba, dichlorprop, fluroxypyr, halauxifen, MCPA, MCPB, mecoprop-p, picloram, quinclorac

GROUP 5
(Grass & Broadleaf control)
atrazine, hexazinone, metribuzin, simazine

GROUP 6
(Broadleaf Control)
bentazon, bromoxynil

GROUP 8
(Grass & Broadleaf control)
EPTC, triallate

GROUP 9
(Grass & Broadleaf control)
glyphosate

GROUP 10
glufosinate

GROUP 14
(Grass & Broadleaf control)
acifluorfen, carfentrazone, flumioxazin, fomesafen, saflufenacil, sulfentrazone

GROUP 15
dimethenamid, metolachlor, propyzamide, pyroxasulfone

GROUP 22
diquat, paraquat

GROUP 27
pyrasulfotole, topramezone

SASKATCHEWAN MINISTRY OF AGRICULTURE
3085 Albert Street Regina, Saskatchewan CANADA S4S 0B1
www.saskatchewan.ca/agriculture
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Table 1: Metric Conversion Factors* (Approximate)

Metric Unit	*Metric to Imperial Multiply By*	*Imperial Unit*	*Imperial to Metric Multiply By*	*Metric Unit*
LINEAR				**LINEAR**
centimetre (cm)	x 0.39	inch	x 2.54	centimetre (cm)
AREA				**AREA**
square metre (m^2)	x 1.2	square yard	x 0.84	square metre (m^2)
hectare (ha)	x 2.5	acres	x 0.4	hectare (ha)
VOLUME				**VOLUME**
litre (L)	x 0.22	gallon	x 4.55	litre
PRESSURE				**PRESSURE**
kilopascals (kPa)	x 0.14	psi	x 6.9	kilopascals (kPa)
WEIGHT				**WEIGHT**
gram (g)	x 0.035	oz	x 28.35	gram (g)
kilogram (kg)	x 2.2	lb	x 0.454	kilogram (kg)
AGRICULTURAL				**AGRICULTURAL**
litres per hectare (L/ha)	x 0.089	gallons per acre	x 11.23	litres per hectare (L/ha)
litres per hectare (L/ha)	x 0.357	quarts per acre	x 2.81	litres per hectare (L/ha)
litres per hectare (L/ha)	x 0.71	pints per acre	x 1.41	litres per hectare (L/ha)
millilitres per hectare (mL/ha)	x 0.014	fl.oz per acre	x 70.22	millilitres per hectare (mL/ha)
kilograms per hectare (kg/ha)	x 0.89	lb per acre	x 1.12	kilograms per hectare (kg/ha)
grams per hectare (g/ha)	x 0.014	oz per acre	x 70	grams per hectare (g/ha)

*EXAMPLE: To convert centimetres to inches, multiply by 0.39; conversely, to convert inches to centimetres, multiply by 2.54. CAUTION: Herbicide labels are in metric units only. Conversion between the Metric and Imperial system may result in confusion. It is recommended to use metric units only.

Guide to Crop Protection 2016

For Reference Until December 31, 2016
This publication is updated annually and replaces
the 2015 and previous issues.

Introduction

How to Use This Book

This publication is only a guide. Always refer to the product label for application details and precautions. If the information in this publication differs from the label information, follow label instructions.

The *Guide to Crop Protection* is divided into five chapters: (1) Introduction; (2) Weed Control; (3) Foliar Fungicides; (4) Seed Treatments; and (5) Insect Control.

To use the information in each of these sections, use the following process:

1. Turn to the charts at the beginning of each section. There is a set of charts for weeds, plant diseases and insect control. Select the chart for the crop you want or plan to grow. Use the chart to match your weed, disease or insect problems with the products available for that crop.
2. Once you have narrowed your product choices down to a few candidates, go to the recommendation section for that product. Products are listed alphabetically. Read the recommendations thoroughly for each product you are considering.
3. Read the product label attached to the container for detailed instructions on application.

This publication is intended to be used as a guide only. Information contained herein is that available at time of printing. While every effort has been made to ensure accuracy, the provincial government does not accept responsibility for label changes. When more than one trade name is listed, not all weeds or tank mixes may appear on all labels. Consult product labels attached to pesticide containers for final detailed instructions.

Certain recommendations in this publication are given in quantity of commercial product per acre (mL, L, g or kg/acre). Product labels are given in quantity of product per hectare (mL, L, g or kg/ha). To avoid application errors be sure to read and understand label recommendations.

The *Guide to Crop Protection* includes the most recent recommendations for weed, plant disease and insect control in field and forage crops. These recommendations are based on the uses registered under the Pest Management Regulatory Agency's *Pest Control Products Act*. It is an offence under *The Pest Control Products Act* to apply any chemical in a manner not consistent with the product label. If you have any doubts regarding the instructions in this publication, or on the product label, contact the company representative, your local agricultural office or the Pest Management Regulatory Agency for further advice.

Product Labels and PCP Numbers

On each Product Page you will see a Registration or PCP number, so named because it is mandated by the *Pest Control Products Act*. Under the Act, every pesticide requires a unique identifier – the product's Registration or PCP number. That number must also appear on the product's label.

The pesticide label packaged with the product is the authoritative source of information on use of the product and will contain more detailed information than is included in this Guide. Some products have a number of trade names for the same active ingredient. However, each product will have its own Registration (PCP) number and these appear next to the registrants' names. Users who are seeking more detailed information than is provided in this guide, prior to purchase, can use the Registration (PCP) number to access a sample product label online through the Pest Management Regulatory Agency's (PMRA) website or they can contact the PMRA Hotline by phone at 1-800-267-6315.

Use this link – http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php to access Electronic Label Search Tool. The PMRA Product Information database can be searched by a product's trade name, active ingredient, company name or Registration (PCP) number. Since several products can contain the same active ingredient and there are often several versions of the same or similar labels on this database, using the PCP number is the most direct route to finding the label that links to the product page in this Guide. ***There may*** *be some differences between a label found on the package and the sample labels found on the PMRA-Label Search web site so always refer to the packaged product label when applying the product.*

Once the product is located, you may click on its number to view an Adobe Acrobat (PDF) document containing the label and any supplemental registrations. Some of these documents run to many pages but you can use the 'Find' capabilities of the Acrobat Reader plug-in for your browser to jump to specific areas of interest. If you do not have Adobe Acrobat Reader installed on your computer you can download a free version from www.adobe.com

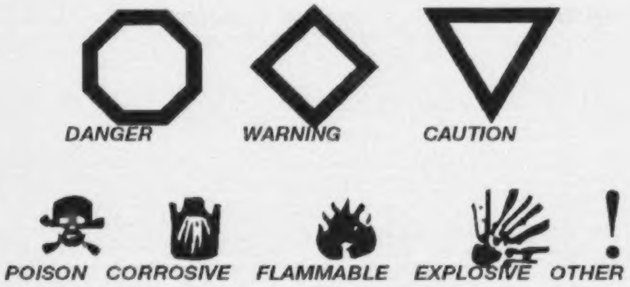
Safe Use of Herbicides, Fungicides and Insecticides

Herbicides, fungicides and insecticides are classified according to the use hazard and risk involved. The categories of hazard are:

- toxicity
- flammability
- explosive potential
- corrosivity
- other

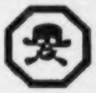
The degree of risk is represented by symbols taken from common traffic sign shapes represented by the stop, caution and yield signs. The signal word for each of the signs is danger (high risk), warning (moderate risk) and caution (low risk). Where the risk is minimal, no designation is required. The label on the container will carry the appropriate signs for the protection of the user. Degree of risk symbols for herbicides, insecticides and fungicides used in field and forage crops are included in the product directory. The symbols are illustrated in Figure 1.

Figure 1. Degree of Risk and Hazard Symbols

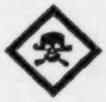


LD_{50} values are used to rate the toxicity of pesticides. The LD_{50} refers to the dose of pesticide (in mg per kg of the test animal's body weight) that is lethal to 50 percent of the group of test animals. For example, if a pesticide has an LD_{50} value of 10 mg/kg, and the test animals each weigh 1 kg, then 50 percent of the animals would die if they each ate 10 mg of the pesticide.

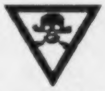
Table 2. Oral LD_{50} Values as they relate to the Risk/Hazard Symbols



DANGER POISON
LD_{50} less than 500 mg/kg
indicates high toxicity



WARNING POISON
LD_{50} 500-1,000 mg/kg
indicates moderate toxicity



CAUTION POISON
LD_{50} 1,000-2,500 mg/kg
indicates low toxicity

SYMBOL ABSENT
LD_{50} greater than 2,500 mg/kg
indicates very low toxicity

Different types of protective equipment are required for pesticides that differ in toxicity. Special equipment requirements are described on the product label, but in general the following precautions must be taken when using pesticides of different hazard ratings.

Danger Poison - requires goggles, respirator, gloves and skin protection, avoid fumes and spray mist.

Warning Poison - requires goggles, gloves and skin protection, avoid fumes and spray mist.

Caution Poison - requires gloves and skin protection, avoid fumes and spray mist.

The absence of a hazard symbol on a pesticide label indicates low toxicity to mammals. Nevertheless, protective clothing should be worn when using pesticides that do not have a hazard symbol.

Protecting Yourself from Exposure to Herbicides, Fungicides and Insecticides

The use of protective equipment and sound safety procedures will help minimize your exposure to herbicides, fungicides and insecticides. Follow the 10 rules for safe application listed below, and wear the safety equipment recommended.

10 Rules for Safe Application

1. Never smoke or eat while applying pesticides.
2. Avoid inhaling sprays or dusts. Wear protective clothing and a respirator.
3. Sprayer lines carrying chemicals should not enter the operator's cab.
4. Have soap, water and a towel available. Should concentrated product spill on skin, hands, face or eyes, wash immediately.
5. Wash hands and face when leaving the treated area, before break periods, lunch or urination.

6. Bathe or shower and change into clean clothing after working with pesticides. Wash clothing each day before re-use.
7. Call a physician or get the patient to a hospital immediately if symptoms of illness occur during or shortly after pesticide application. Be sure to take along the product label or container.
8. Store pesticides out of reach of children and where there is no chance of contact with human food or livestock feeds. Do not store herbicides with insecticides and avoid cross-contamination. Storage areas should be locked.
9. Keep chemicals in their original containers, never in unmarked containers or bottles used for food or drink.
10. Follow proper container disposal methods. All containers should be triple rinsed or pressure rinsed, punctured to render the container non-reusable, and delivered to designated disposal sites.

Protective Clothing

Wear protective equipment as described in the chart to reduce exposure.

EQUIPMENT	PROTECTION	HOW TO WEAR IT
Coveralls	There are two types of coveralls: disposable and reusable. Disposable coveralls are lightweight and comfortable on warm days. They can be worn for mixing and applying pesticides, then discarded at the day's end. If they become contaminated, they should be discarded at once. The second type of coverall is made of washable fabric and may be reused many times. These fabric coveralls are adequate for use with all but the most highly toxic and concentrated pesticides.	Button (or zip) right up to the neck. Loose coveralls around the neck will suck and blow pesticide in and out of the interior of the coveralls as you bend and move. Wear coveralls over a long-sleeved shirt and pants.
Aprons	When pouring or otherwise handling concentrated pesticides, it makes good sense to wear protection in the form of an apron. The apron protects the front of your body from spills or splashes of the concentrate. The apron should be made of rubber or synthetic liquid-proof material that will resist the solvents used in formulating the pesticide.	Make sure the apron covers your body from your chest to your boots.
Gloves	Protect your hands by wearing chemical-resistant gloves. Neoprene gloves provide the best protection. Natural rubber gloves may be used when handling organo-phosphorus or carbamate pesticides. Be sure that they are designed for use with solvents and pesticides. Never use lined gloves, gloves with wristbands or leather gloves.	Put gloves on and roll up the first inch or two of the cuff. That way when you lift your hands, any liquid on the gloves won't drip down your arms.
Hats	Use a chemical-resistant hat, preferably made of washable plastic. The hat may be a hard hat or made of flexible plastic. In either case, it should have a plastic sweatband. Wash and dry entire hat after each use and before storing. Ordinary baseball caps with cloth sweatbands are dangerous as they absorb the pesticide and recontaminate the forehead each time you wear them. Even small amounts of moderately or slightly toxic pesticides may cause severe skin irritation or other illness if exposure continues for several days.	
Boots	Wear chemical-resistant, unlined boots. These boots are available in a variety of styles and materials. Neoprene boots are the best. Knee-length boots offer greater protection because they extend above the lower end of the apron. Avoid leather or fabric boots and shoes because these will absorb pesticides and cannot be cleaned effectively.	Wear your pant legs outside the top of your boots. This will prevent spills and splashes from running into the boot and onto your leg.

Protecting Your Eyes, Face and Lungs

Wear the following equipment to protect your facial area from exposure:

EQUIPMENT	PROTECTION	HOW TO WEAR IT
Goggles	Chemical-resistant goggles keep your eyes safe from both splashing and, if using dry formulations, dusts or granules. Don't use goggles with cloth or elastic headbands as these will absorb pesticides.	Wear goggles snugly on your face so that the sides of your head are protected from splashes. If you wear glasses, make sure you purchase goggles that fit snugly over them. Never wear contact lenses when working around pesticides.
Respirators	Only NIOSH-approved respirators should be used. Do not exchange parts of different respirators. (For example, do not use a cartridge produced by Company "A" with a respirator produced by Company "B" as the combination may not provide adequate protection to the user). Dust masks are ineffective in protecting against herbicide vapours. Similarly, the filters on tractor cabs are intended to remove dust and are not designed to protect against herbicide vapours or mists. Chemical cartridge respirators are recommended for outdoor use when mixing and applying herbicides.	When carrying out operations, change filters each day. The cartridge should be replaced when chemical odour becomes apparent or when breathing becomes difficult. New cartridges should always be installed at the beginning of the spray season. Prior to commencing work, check the face seal while the respirator is on the wearer's face. Regardless of design, respirators cannot be worn securely by people wearing beards, moustaches or sideburns.
Face Shields	Goggles offer some protection, but frequently full-face protection is advised or required according to the pesticide label. It is especially important to protect your eyes and face when pouring or mixing liquid concentrates. Effective face shields are made of clear plastic.	Since the shield attaches to the hard hat, you can raise or lower it as needed.

Avoiding Spray Drift

To minimize the risk of drift, follow these guidelines:

1. Do not spray in winds above 15 km/h (9 mph).
2. Do not spray under dead calm conditions in early morning, night, or late evening. These are often associated with temperature inversions and the combination of these factors can result in long-distance spray drift (2 km or more). Fog or dust that seems to hang in the air is a good indicator of an inversion.
3. Avoid nozzle pressures above 45 psi (310 kPa) for conventional flat fan tips.
4. Use a minimum of 45 L/acre water for all pesticides unless otherwise specified for the product.
5. Take note of buffer zones identified in the "Restrictions" section of this guide. Do not spray when the wind is blowing towards a nearby sensitive crop, shelterbelt, garden, or water body.
6. Use amine formulations of 2,4-D or MCPA where possible. Use special care when applying volatile herbicides (most herbicides in Group 3 and Group 4, particularly ester formulations). Avoid spraying these products on or immediately before hot days.
7. Ensure that air flow from air assisted sprayers is properly set to minimize airblast rebound and drift for different crop canopies.
8. Operate nozzles at their minimum recommended height. For 80° tips, this is 18" (45 cm), and for 110° tips, this is 12" (35 cm). Orienting nozzles forward allows further height reductions.
9. Special nozzles are now available that create coarse, low-drift sprays. Pre-orifice, Turbo-TeeJet, or venturi-type nozzles are available from a number of manufacturers, and these reduce drift by 50 to 95 percent. (Refer to the section entitled **Herbicide Efficacy with Low-Drift Nozzles**)
10. Consider equipping your sprayer with protective shrouds. A number of different designs are available that can reduce drift between 35 and 75 percent.
11. Reduce travel speeds. rapid air movement over nozzle tips increases the risk of fine droplets prone to drift and turbulence from the sprayer itself can increase the uncertainty of spray deposition.

For more information on reducing drift see the website: www.Sprayers101.com.

Herbicide Efficacy with Low-drift Nozzles

A number of low-drift nozzles are now available from different suppliers. Well established nozzles, such as the Turbo TeeJet, reduce drift by about 50 percent and provide equivalent efficacy to a standard flat fan nozzle. Newer nozzles ("venturi" types) are best known for their dramatic ability to reduce drift (50 to 95 percent). Research suggest that these nozzles perform well at conventional carrier volumes, travel speeds, and product rates. Some aspects require special attention:

Pressure: Some venturi-type nozzles require higher pressures to operate properly. Below 40 psi (275 kPa), patterns for these designs may deteriorate rapidly resulting in poor overlaps and erratic control. Design improvements have resulted in venturi nozzles that require less pressure to operate effectively. When using automatic rate controllers, make sure your pressures match the recommended pressure ranges for good nozzle performance.

Water Volume: Droplet size becomes more important at lower water volumes. Little is known about low-drift nozzle performance at or below 5 gal/acre (23 L/acre). Since low-drift nozzles generate fewer droplets than conventional nozzles, ensure that water volumes are high enough for coverage when using coarse sprays.

Weed Type: Difficult-to-wet weeds, such as wild oats, green foxtail, lamb's-quarters, and cleavers, typically require finer sprays for effective coverage. When using venturi nozzles on these weeds, make sure your pressure is high enough to achieve good coverage. Larger weeds and reduced product rates typically make chemical control more difficult, and these conditions may also reveal some performance differences between nozzles.

Herbicide Type: Herbicides that belong to herbicide Groups 2, 4, and 9 perform well with venturi nozzles, even at normal pressures (40 psi). Application of herbicides in Groups 1, 6, 8, 10 and 14 may require higher pressures with venturi nozzles to maintain good performance, especially under challenging conditions. Wild oat control may be reduced with the coarsest sprays, even when applied at high pressure.

Check with your chemical representative to see if the manufacturer supports the use of low-drift nozzles with their products.

More information is available in the factsheet "Pesticide Application and Choosing the Right Nozzles," available from your local extension office or at the Saskatchewan Ministry of Agriculture Website: www.agriculture.gov.sk.ca

Handling a Drift Complaint

When spray drift occurs, it is important to take the right steps to resolve the complaint. If you suspect that your crop or property has been damaged because of spray drift, use the following guidelines for resolving the situation.

1. Contact the suspected applicator as soon as possible. View the damage with the suspected applicator an determine if that person did, in fact, cause the damage.
2. Are you sure that the symptoms or damage you see has been caused by spray drift? Contact your local agricultural office to the result of spray drift.
3. If the damage was caused by the applicator, determine the extent of the damage and the level of compensation (if any) with the applicator.
4. If the situation cannot be resolved quickly because of disagreements on the extent of damage, cause of the damage, or level of compensation, contact your local agricultural office to discuss options on how to proceed. Documentation will be required, particularly if insurance companies are involved.
5. The involvement of a private consultant is recommended if documentation is required. Required documentation often includes samples of the damaged plants, photographs, and yield comparisons to determine losses. Your agricultural office can provide you with a list of private consultants in your area.
6. The best approach is to start an open and honest line of communication with the suspected applicator. The majority of drift complaints are resolved quickly and efficiently by communicating with the applicator, without the involvement of outside parties.

Mixing Pesticides

The ability to control a broad range of weeds or other pests in one pass is the advantage that a mix of two or more products allows. If tank mixing is not done in the correct order, the result could be a tank-load of material that may not control the target pests, cause injury to the crop, plug nozzles, or leave an undesirable residue in the tank that will require extensive cleaning. Mistakes like these are costly, could put the user at unnecessary risk of exposure to the products, or create an environmental disposal problem.

To avoid mixing that may result in incompatibilities, **always consult the label of the products that are being used** to learn the correct order. **Remember to add all like components at the same stage of mixing.** The list below is a general rule-of-thumb for mixing pesticides:

1. Fill the spray tank with 1/4 to 3/4 the amount of water required for the application and turn on the sprayer agitation. Check the products that are being used for the correct amount to add. Once agitation has begun, maintain until the tank is emptied.
2. Add any water conditioner (fertilizer or pH adjuster) additives to the tank.
3. Add any wettable powders, or water dispersible granules (DF, DG, or WDG). Add dry products slowly to prevent clogged return lines. Allow sprayer to agitate for a few minutes, allowing the product to become completely suspended in the tank, before adding the next component.

4. Shake any containers of liquid pesticide thoroughly before adding to ensure they are well mixed.
5. Add any oil dispersions (OD) or flowable liquid suspensions (F, SC) to the tank. Allow to mix.
6. Add emulsifiable concentrates (EC) or emulsions (ME, SE) to the tank and allow to mix.
7. Add any pesticides that are solutions (SN) (i.e. amines and salts)
8. Add any surfactants or other adjuvants.

Remember to always consult the label for compatible mixes and recommended mixing order.

Many pesticides will break down if left in the tank for an extended period. Try not to mix any more than you can spray at one time. If you need to stop spraying for a short time, leave the sprayer agitation running to keep products from settling or separating in the tank.

Container Disposal

Proper disposal of used containers and unused pesticides is important to protect the environment and prevent contamination of soil and water resources. Rinse all containers prior to disposal to reduce environmental contamination caused by open dumping of unwanted containers. Only mix as much pesticide solution as is needed to treat the desired area.

Triple Rinsing

Triple rinsing renders used pesticide containers (metal, plastic, glass) more than 99.9 percent free of residues, in most cases.

Here are the steps that should be followed:

1. Empty contents of the container into the spray tank and drain in a vertical position for 30 seconds.
2. Add a measured amount of rinse water or other diluent until container is about one-fifth full.
3. Rinse the container thoroughly and pour the rinsate into the spray tank.
4. Repeat the procedure twice (it should take only about 5 minutes in total).
5. Puncture or break triple rinsed containers to render them non-reusable. Paper bags should be rinsed once prior to disposal.

Pressure Rinsing

Pressure rinsers can be used to rinse any size of empty pesticide container that can be lifted into position over the spray tank. A 30 second rinse with a pressure rinser is convenient and just as effective as triple rinsing. Pressure rinsers are constructed to be thrust into the bottom of a metal can or plastic jug. Holes, situated laterally in the rinser tip, direct water from a pressurized source against the inner sides of the container and effectively wash the residual pesticide into the spray tank. Some farmers have found it convenient to attach a rinser to the pump on their large water storage tank to minimize container handling. Pressure rinsers have the added advantage of rendering containers useless by automatically puncturing them.

Disposal of Containers

Properly rinsed containers should be delivered to a designated pesticide container disposal site. Contact your ag Provincial Agriculture Office, municipal office or weed supervisor for the locations of pesticide container disposal sites in your municipality for more information on pesticide container recycling see www.cleanfarms.ca.

Sprayer Cleaning

When pesticide application is completed each day it is important to empty and clean the sprayer thoroughly to prevent the breakdown of certain pesticides, prevent adhesion of the pesticide to the sprayer, and to maintain the sprayer parts in good condition. Certain pesticides break down very quickly when left in solution, and several pesticide solutions can be corrosive to sprayer parts. Sprayer cleaning is especially important when changing from one crop to another or from one pesticide to another. Each year several reports are logged of herbicide damage cause by carryover of product residue in the tank. To avoid the risk of contamination, sprayers should be cleaned as soon as possible after application is completed.

Do not clean sprayers where rinsate can run off into ditches or other water bodies, near sensitive plants or shelterbelts, or where other people or animals are likely to walk, to avoid unnecessary exposure to people, animals and the environment.

There are three basic types of rinse solution for cleaning sprayer tanks. Their recipes and basic procedures are outlined below:

The Ammonia Rinse – Fill spray tank and add 1 L of household ammonia (3%) for every 100 L of clean water needed for the rinse and begin agitation. Allow solution to flush through the booms until the boom is completely filled with ammonia solution and top up the tank with water. Circulate the ammonia solution through the tank and pump system for 15 minutes. Flush hoses and booms with ammonia rinse solution again (minimum 5 minutes) before emptying. Remove nozzles and screens and scrub with 0.1 L household ammonia per 10 L clean water and an old toothbrush. Perform clean water rinse to remove ammonia solution prior to next spray load. Some herbicides recommend leaving the ammonia rinse in the tank over night to improve cleaning potential.

The Fresh Water Rinse – The spray tank cleaning should begin and end with a fresh water rinse to remove the majority of potential contaminants prior to the cleansing process or prior to the next round of spraying. Drain the tank of its previous contents and fill the tank with clean water. Open nozzle valves and pump clean water through the booms and hoses. Top up the tank with more clean water and circulate/agitate for at least 10 minutes and empty the tank of waste water. If this is the first rinse after spraying, a high pressure hose could be used to clean residue from all surfaces in the tank. Do not enter the tank during the cleaning process.

The Detergent Rinse – After rinsing with clean water, fill spray tank and add a heavy-duty detergent at 0.25 L per 100 L of water (some suggest a non-ionic surfactant such as Agral 90 or Agsurf at 0.6 L per 100 L of water). Circulate the mixture for a minimum of 5 minutes and spray out through sprayer nozzles. Nozzles and screens are removed and cleaned individually with the same detergent solution in a small container. Soaking in this solution for several hours also helps to loosen any deposits.

The above solutions are just components of the overall sprayer cleaning process. Typical rinse instructions will repeat a combination of one or two or all of these basic rinses. Below we will give some generic rinse instructions utilizing the basic rinses as components of the larger cleaning procedure. Never enter the tank during the cleaning process as some cleansers may release dangerous gases.

Method A –
Drain contents of tank – 1 to 2 X Water Rinse – 2X Ammonia Rinse – 2X Water Rinse (one just prior to the next spraying event)

Method B –
Drain Contents of tank – 2X Water Rinse – 2X Detergent Rinse – 2X Water Rinse

Method C -
Drain Contents of tank – Several repetitions of the Water Rinse with nozzles and screens removed and checked for debris.
Products: Adrenalin, Altitude, Amitrol 240, Ares.

The above directions are general processes based on the similarities of tank cleaning recommendations between products in each of the herbicide groupings. Always follow the specific instructions on the product label.

Several products in the guide do not have label instructions regarding tank cleaning. In the case of products that have no cleaning recommendations on the label, there are some basic principals that can be applied. Products that are water based formulations can usually be cleaned from spray tanks using Method C above. Products that are formulated as an EC, SC or F (flowable) or use a petroleum based adjuvant should at least use Method B. The detergent breaks down the oil that may be sticking to the side of the tank. Products in Group 2 (most will already have a recommendation), with the exception of the 'IMI' products from BASF, will require the use of Method A. The ammonia in Method A either increases the solubility of the product allowing it to be easily removed from the tank surfaces or speeds the breakdown of these products in water. If the product that is to be cleaned out of the tank is a combination of these elements, use a combination of Methods to clean the tank. In these cases, use a good commercial tank-cleaning product from a recognized source, with both ammonia and detergent as components.

Group 2 compounds are highly active on sensitive plants so even a small amount remaining in the sprayer can present a risk of injury. They can also occasionally be trapped on the tank walls and plumbing by petroleum based formulations or adjuvants when tank mixed with other products, resulting in tank residues that may be tougher to remove. A way to reduce the chance of this occurring is to add detergent at 0.25 L per 100 L to the Ammonia Rinse portion to assist with the breakdown of the petroleum coating so that the ammonia may rid the tank of Group 2 product.

It is very important to clean sprayers immediately after every use. With a more diverse rotation, the likelihood of damage from lack of care increases dramatically.

How to Identify Crop and Weed Leaf Stages

Recognition of plant growth stages is essential for effective weed and disease control. Many herbicides and fungicides are safe on a crop only when applied at a specific growth stage. Similarly, weeds are controlled only when they are at certain growth stages.

For most post-emergent products, growth stages are described by the number of leaves. The following is a description of how to count leaves for staging.

Cereals and Annual Grass Weeds

Manufacturers generally use two different systems of staging for grasses. The minimum stages of application are similar, while the later stages may differ.

Some manufacturers use "Total Leaf Count" stages based on the number of leaves on the entire plant, including tillers or secondary shoots. Most recommendations however, are based on the number of main stem leaves and tillers. Tillers or stools are the secondary shoots or stems of a grass plant. Similar to the branches of a broadleaf plant, tillers will emerge from the axils between the leaf and main shoot. Tillers usually begin to appear at the 3 or 4 leaf stage. When staging a plant in this manner, be sure to identify the tillers first, then count only leaves that originate from the main shoot.

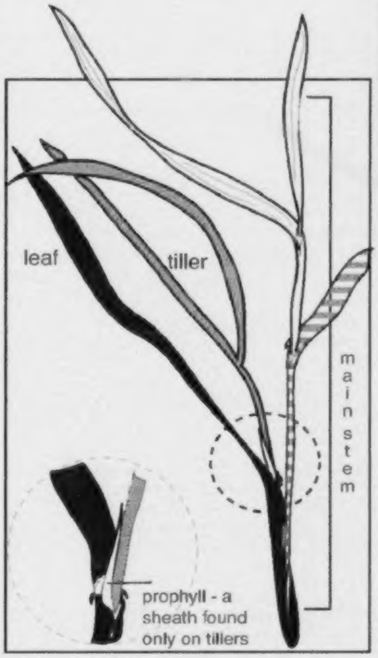

leaf
tiller
main stem
prophyll - a sheath found only on tillers

Figure 2. Leaf Stages of Cereals and Annual Grass Weeds

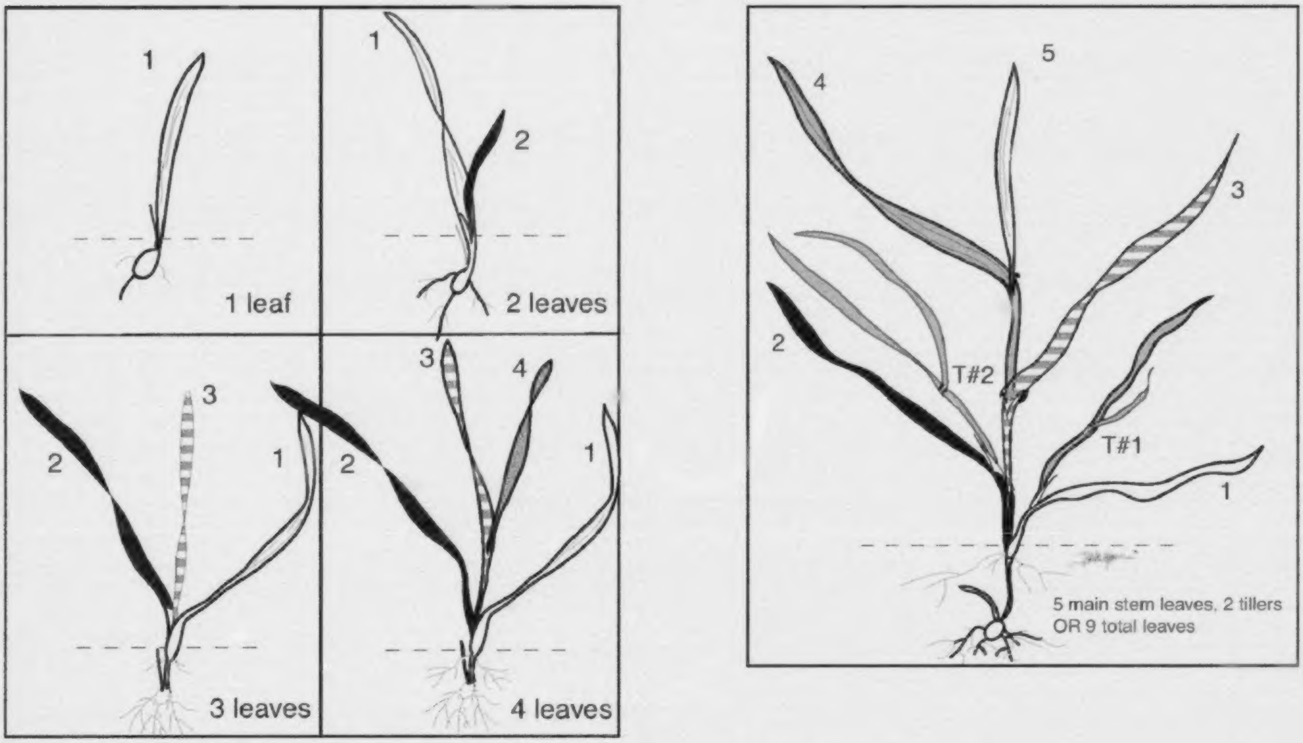
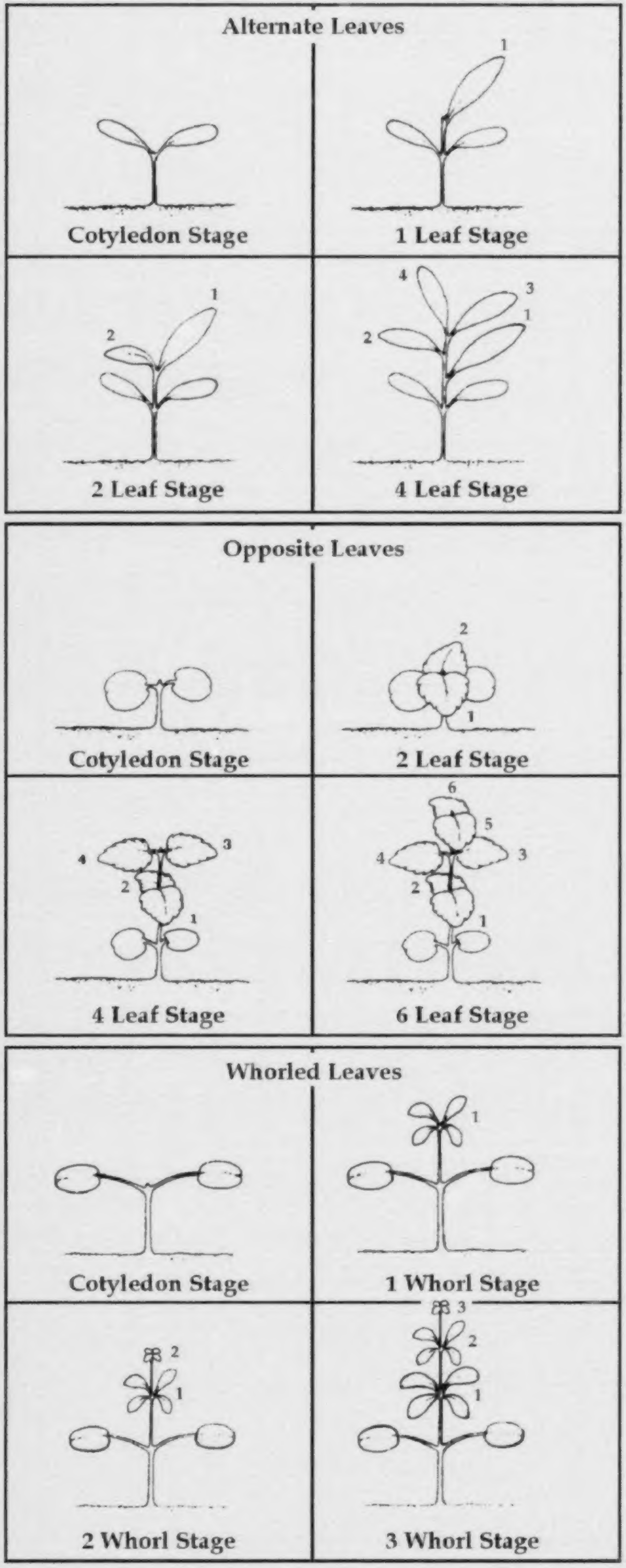

1
1 leaf
1
2
2 leaves
2
3
1
3 leaves
3
4
2
1
4 leaves
4
5
3
2
T#2
T#1
1
5 main stem leaves, 2 tillers OR 9 total leaves

Figure 3. Leaf Stages of Broadleaf Weeds and Crops


Alternate Leaves
Cotyledon Stage
1 Leaf Stage
2 Leaf Stage
4 Leaf Stage
Opposite Leaves
Cotyledon Stage
2 Leaf Stage
4 Leaf Stage
6 Leaf Stage
Whorled Leaves
Cotyledon Stage
1 Whorl Stage
2 Whorl Stage
3 Whorl Stage

Broadleaf Weeds

Cotyledons - These are the seed leaves that usually emerge above ground. On some plants, such as fababeans, lentils and peas, they stay below the soil surface. Cotyledons are not true leaves and are not counted when determining leaf number. They are a different shape than the true leaves and may dry up and disappear at an early stage.

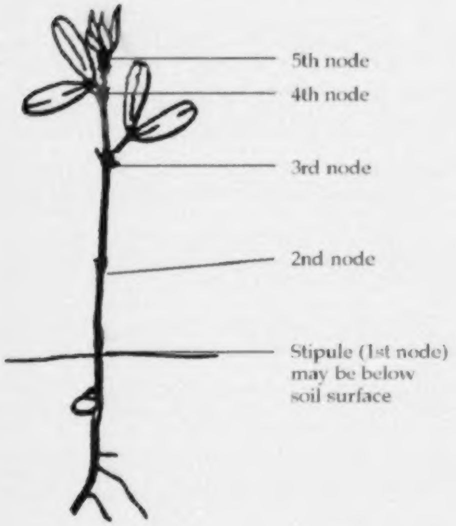
Alternate leaves - Some plants have one leaf at each node on the stem. The next leaf emerges at the next higher node and extends away from the stem in the opposite direction. These plants (lamb's quarters and wild mustard are good examples) are said to have alternate leaves. To determine the leaf stage, simply count the number of leaves present (Figure 3).

Opposite leaves - Plants with two leaves at each node, one on each side of the stem, are said to have opposite leaves. The next pair of leaves on the next node are rotated about 45° so that they are not directly over the previous pair. Plants with opposite leaves have even-leaf numbers only. When counting, the leaf number progresses from cotyledons to 2 leaf, 4 leaf, etc. These plants generally appear shorter than plants with alternate leaves at a similar leaf stage. **Be sure to count each pair as two leaves.** Hemp nettle is a weed that has opposite leaves (Figure 3).

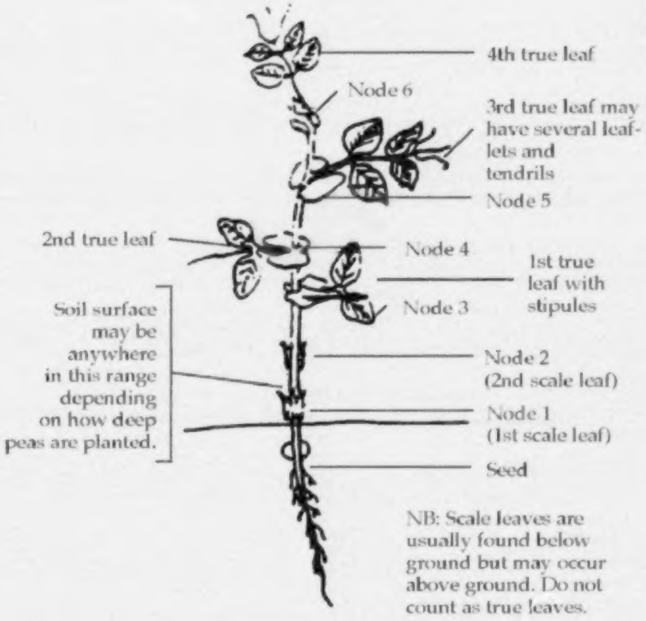
Whorled leaves - More complex plants like cleavers may have whorled leaves. These plants have three or more leaves at each node on the stem. The leaf number in each whorl may vary, so be sure to count each individual leaf unless the Guide or label recommendation refers to the number of leaf whorls (Figure 3).

Figure 4. Leaf Stages of Certain Special Crops and Forages

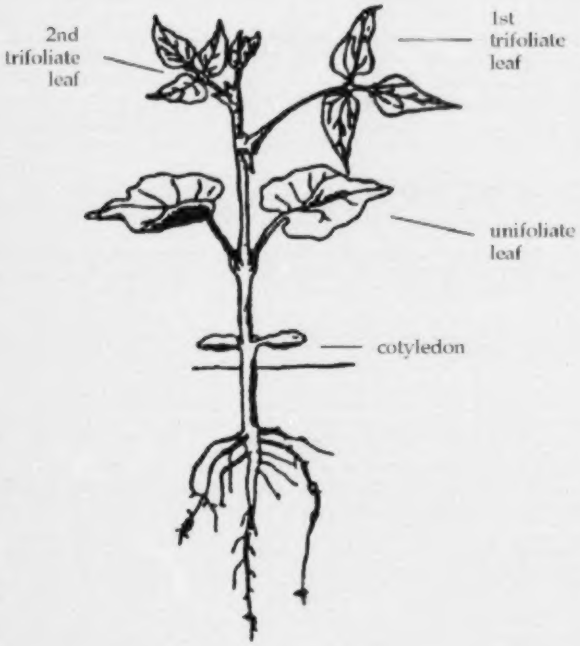
Lentil Seedling


5th node
4th node
3rd node
2nd node
Stipule (1st node) may be below soil surface

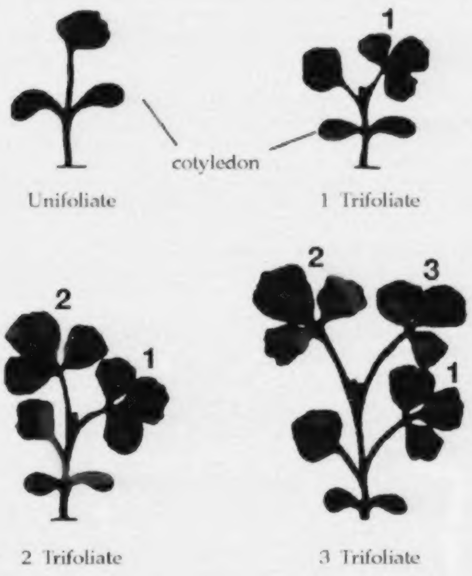
Field Pea Seedling


4th true leaf
Node 6
3rd true leaf may have several leaflets and tendrils
Node 5
2nd true leaf
Node 4
1st true leaf with stipules
Node 3
Soil surface may be anywhere in this range depending on how deep peas are planted.
Node 2 (2nd scale leaf)
Node 1 (1st scale leaf)
Seed
NB: Scale leaves are usually found below ground but may occur above ground. Do not count as true leaves.

Dry Bean Seedling


2nd trifoliate leaf
1st trifoliate leaf
unifoliate leaf
cotyledon

Forage Legume Seedling


cotyledon
Unifoliate
1
1 Trifoliate
2
1
2 Trifoliate
2
3
1
3 Trifoliate

Stages of Alfalfa, Red Clover and Alsike Clover Leaf Development

TRADE NAMES, ACTIVE INGREDIENTS & FORMULATIONS

Legend: **(F) = formulated component; (B) = blended granules; (DC) = divided container**

WP	wettable powder	EC	emulsifiable concentrate	SP	water soluble powder	SL	soluble concentrate	A	amine
WG	water dispersible granule	G	granule	EW	emulsion, oil in water	OD	oil dispersion	E	ester
TB	Tablet	SC	suspension concentrate	DS	powder/dust for dry seed treatment	FS	flowable concentrate for seed treatment	LS	solution for seed treatment
SG	water soluble granule								

Herbicides

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
2,4-D Amine - 200 g/L SL (F)	aminopyralid - 40 g/L SL (F)			*Restore II*	Dow AgroSciences
2,4-D Amine - 295 g/L SL (F)	dicamba - 110 g/L SL (F)	mecoprop-P - 80 g/L SL (F)		*DyVel DSp*	BASF Canada
2,4-D Amine - 600, 700 g/L SL				*2,4-D Amine*	Various
2,4-D Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Approve*	Nufarm Agriculture
2,4-D Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Leader*	IPCO
2,4-D Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Thrasher II*	ADAMA Canada
2,4-D Ester - 240 g/L EC (F)	bromoxynil - 90 g/L EC (F)	fluroxypyr - 80 g/L EC (F)		*Enforcer D*	Nufarm Agriculture
2,4-D Ester - 240 g/L SL (F)	picloram - 65:240 g/L SL (F)			*Grazon*	Dow AgroSciences
2,4-D Ester - 280 g/L EC (F)	bromoxynil - 280 g/L EC (F)			*Thumper*	Bayer CropScience
2,4-D Ester - 282 g/L EC (F)	dichlorprop - 300 g/L EC (F)			*Dichlorprop-D*	IPCO
2,4-D Ester - 282 g/L EC (F)	dichlorprop - 300 g/L EC (F)			*Turboprop*	UAP
2,4-D Ester - 360 g/L EC (F)	fluroxypyr - 90 g/L EC (F)			*OcTTain XL*	Dow AgroSciences
2,4-D Ester - 360 g/L EC (F2)	fluroxypyr - 90 g/L EC (F2)	clodinafop - 25 g/L EC (F1)	pinoxaden - 25 g/L EC (F1)	*TraxosTwo*	Syngenta Crop Protection
2,4-D Ester - 360 g/L SL (F)	picloram - 97.5 g/L SL (F)			*Grazon XC*	Dow AgroSciences
2,4-D Ester - 400 g/L EC (F)	dichlorprop-P - 210 g/L EC (F)			*Dichlorprop-DX*	IPCO
2,4-D Ester - 400 g/L EC (F)	dichlorprop-P - 210 g/L EC (F)			*Estaprop XT*	Nufarm Agriculture
2,4-D Ester - 564 g/L EC	aminopyralid - 52.5% WG (F)	metsulfuron - 9.45% WG (F)		*Reclaim*	Dow AgroSciences
2,4-D Ester - 564 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG	fluroxypyr - 180 g/L EC		*Retain SG*	Loveland Products
2,4-D Ester - 600, 700 g/L EC				*2,4-D Ester*	Various
2,4-D ester - 660 g/L EC	carfentrazone - 240 g/L EC			*BlackHawk*	Nufarm Agriculture
2,4-D Ester - 660 g/L EC	florasulam - 50 g/L SC			*Frontline 2,4-D XC*	Dow AgroSciences
2,4-D Ester - 660 g/L EC	fluroxypyr - 180 g/L EC			*Flurox-24*	Nufarm Agriculture
2,4-D Ester - 660 g/L EC	fluroxypyr - 180 g/L EC			*Rush 24*	ADAMA Canada
2,4-D Ester - 660 g/L EC	fluroxypyr - 333 g/L EC			*Attain XC*	Dow AgroSciences
2,4-D ester - 660 g/L EC	tribenuron - 75% WG			*Ko-Act*	Nufarm Agriculture
2,4-D Ester - 660 g/L EC				*Salvo*	UAP
2,4-D ester - 660g/L EC	tribenuron - 8.25% WG (F)	dicamba - 58.45% WG (F)		*Triton K*	E. I. duPont Canada
2,4-DB Ester - 625 g/L EC				*Caliber*	Loveland Products
2,4-DB Ester - 625 g/L EC				*Cobutox 625*	IPCO
2,4-DB Ester - 625 g/L EC				*Embutox 625*	Nufarm Agriculture
Acifluorfen - 240 g/L SL				*Blazer*	United Phosphorus Inc.
Aminopyralid - 40 g/L SL (F)	2,4-D Amine - 200 g/L SL (F)			*Restore II*	Dow AgroSciences
Aminopyralid - 52.5% WG (F)	metsulfuron - 9.45% WG (F)	2,4-D Ester - 564 g/L EC		*Reclaim*	Dow AgroSciences
Amitrole - 231 g/L SL				*Amitrol 240*	Nufarm Agriculture
Atrazine - 320 g/L SC (F)	metolachlor - 400 g/L SC (F)			*Primextra II Magnum*	Syngenta Crop Protection
Atrazine - 480 g/L SC				*AAtrex Liquid*	Syngenta Crop Protection
Bentazon - 429 g/L SL (F)	imazamox - 20 g/L SL (F)			*Viper ADV*	BASF Canada
Bentazon - 480 g/L SL				*Basagran*	BASF Canada
Bentazon - 480 g/L SL				*Basagran Forté*	BASF Canada
Bromoxynil - 175 g/L EC (F)	thiencarbazone - 5 g/L SC (F)	pyrasulfotole - 31.3 g/L EC (F)		*Velocity m3*	Bayer CropScience
Bromoxynil - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	2,4-D Ester - 200 g/L EC (F)		*Enforcer M*	Nufarm Agriculture

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
Bromoxynil - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	MCPA ester - 200 g/L EC (F)	thifensulfuron:tribenuron - 50%:25% SG	*Enforcer MSU*	Nufarm Agriculture
Bromoxynil - 210 g/L EC (F)	pyrasulfotole - 37.5 g/L EC (F)	pinoxaden - 50 g/L EC		*Axial iPak*	Syngenta Crop Protection
Bromoxynil - 210 g/L EC (F)	pyrasulfotole - 37.5 g/L EC (F)			*Infinity*	Bayer CropScience
Bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			*Approve*	Nufarm Agriculture
Bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			*Leader*	IPCO
Bromoxynil - 225 g/L EC (F)	2,4-D Ester - 225 g/L EC (F)			*Thrasher II*	ADAMA Canada
Bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			*Badge*	ADAMA Canada
Bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			*Logic M*	IPCO
Bromoxynil - 225 g/L EC (F)	MCPA Ester - 225 g/L EC (F)			*Mextrol 450*	Nufarm Agriculture
Bromoxynil - 235g/L EC	carfentrazone - 240 g/L EC			*Conquer*	Nufarm Agriculture
Bromoxynil - 235g/L EC				*Koril 235*	Nufarm Agriculture
Bromoxynil - 240 g/L EC				*Bromotril II*	ADAMA Canada
Bromoxynil - 240 g/L EC				*Brotex*	IPCO
Bromoxynil - 280 g/L EC				*Pardner*	Bayer CropScience
Bromoxynil - 280 g/L EC (F)	2,4-D Ester - 280 g/L EC (F)			*Thumper*	Bayer CropScience
Bromoxynil - 280 g/L EC (F)	MCPA Ester - 280 g/L EC (F)			*Buctril M*	Bayer CropScience
Bromoxynil - 480 g/L SL				*Brotex 480*	IPCO
Bromoxynil - 480 g/L SL				*Loveland Bromax*	Loveland Products
Bromoxynil - 87.5 g/L EC (F)	fenoxaprop-p - 46 g/L EC (F)	pyrasulfotole - 15.5 g/L EC (F)		*Tundra*	Bayer CropScience
Bromoxynil - 90 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	2,4-D Ester - 240 g/L EC (F)		*Enforcer D*	Nufarm Agriculture
Carfentrazone - 240 g/L EC	2,4-D ester - 660 g/L EC			*BlackHawk*	Nufarm Agriculture
Carfentrazone - 240 g/L EC	bromoxynil - 235g/L EC			*Conquer*	Nufarm Agriculture
Carfentrazone - 240 g/L EC	glyphosate - 356 g/L SL			*Cleanstart*	Nufarm Agriculture
Carfentrazone - 240 g/L EC	pyroxasulfone - 85% WG			*Focus*	FMC of Canada
Carfentrazone - 240 g/L EC	sulfentrazone - 480 g/L SC			*Authority Charge*	FMC of Canada
Carfentrazone - 240 g/L EC				*Aim*	FMC Canada
chlormequat chloride - 620 g/L SL				*Manipulator*	Engage Agro
Clethodim - 240 g/L EC				*Arrow*	ADAMA Canada
Clethodim - 240 g/L EC				*Centurion*	Bayer CropScience
Clethodim - 240 g/L EC				*Select*	Arysta LifeScience
Clethodim - 240 g/L EC				*Shadow RTM*	Loveland Products
Clodinafop - 112 g/L (F)	fluroxypyr - 217 g/L EC (F)			*Signal FSU*	Nufarm Agriculture
Clodinafop - 128 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG			*Harmony SG*	E. I. duPont Canada
clodinafop - 128 g/L EC	thifensulfuron:tribenuron - 7.7%:3.9% WG	dicamba - 54% WG		*Harmony K*	E I duPont Canada
clodinafop - 240 g/L EC				*Aurora*	Farmers of North America
clodinafop - 240 g/L EC				*Bullwhip*	FMC of Canada
clodinafop - 240 g/L EC				*Foax*	Great Northern Growers
clodinafop - 240 g/L EC				*Harmony Grass 240 EC*	E. I. duPont Canada
clodinafop - 240 g/L EC				*Ladder*	ADAMA Canada Inc.
clodinafop - 240 g/L EC				*Signal*	Nufarm Agriculture
clodinafop - 240 g/L EC				*Slam'R*	AgriStar
clodinafop - 25 g/L EC (F)	pinoxaden - 25 g/L EC (F)			*Traxos*	Syngenta Crop Protection
clodinafop - 25 g/L EC (F1)	pinoxaden - 25 g/L EC (F1)	2,4-D Ester - 360 g/L EC (F2)	fluroxypyr - 90 g/L EC (F2)	*TraxosTwo*	Syngenta Crop Protection
clodinafop - 60 g/L EC				*Foothills NG*	Loveland Products
clodinafop - 60 g/L EC				*Horizon NG*	Syngenta Crop Protection
clodinafop - 60 g/L EC				*NextStep NG*	Arysta LifeScience
clopyralid - 360 g/L SL	glyphosate - 480 g/L SL			*Eclipse III*	Dow AgroSciences
clopyralid - 360 g/L SL				*Lontrel 360*	Dow AgroSciences
clopyralid - 50 g/L EC (F)	florasulam - 50 g/L SC	MCPA Ester - 280 g/L EC (F)		*Spectrum*	Dow AgroSciences
clopyralid - 50 g/L EC (F)	fluroxypyr - 333 g/L EC	MCPA Ester - 280 g/L EC (F)		*Prestige XC*	Dow AgroSciences
clopyralid - 50 g/L EC (F)	MCPA Ester - 280 g/L EC (F)			*Curtail M*	Nufarm Agriculture
clopyralid - 61 g/L EC (F)	fluroxypyr - 61 g/L EC (F)	MCPA Ester - 224 g/L EC (F)		*Hat Trick*	Loveland Products
clopyralid - 75% WG	imazamox - 70% WG			*Tensile*	BASF Canada
clopyralid - 75% WG	imazapyr - 15 g/L SL (F)	imazamox - 33 g/L SL (F)		*Salute*	Dow AgroSciences
clopyralid - 90g/L SL (F)	fluroxypyr - 90 g/L EC (F)			*Momentum*	Loveland Products

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
dicamba - 110 g/L SL (F)	mecoprop-P - 80 g/L SL (F)	2,4-D Amine - 295 g/L SL (F)		*DyVel DSp*	BASF Canada
dicamba - 480 g/L SL	florasulam - 25% WG			*Korrex*	Dow AgroSciences
dicamba - 480 g/L SL	rimsulfuron - 25% WG	metalachlor - 915 g/L EC		*Battalion*	E. I. duPont Canada
dicamba - 480 g/L SL	tribenuron - 50% SG			*Express FX*	E.I. duPont Canada
dicamba - 480 g/L SL				*Banvel II*	BASF Canada
dicamba - 480 g/L SL				*Banvel VM*	Engage Agro (BASF)
dicamba - 480 g/L SL				*Hawkeye Power*	Adjuvants Plus (Gharda)
dicamba - 480 g/L SL				*Oracle*	Adjuvants Plus (Gharda)
dicamba - 480 g/L SL				*VMD 480*	Adjuvants Plus (Gharda)
dicamba - 50% WG (F)	diflufenzopyr - 20% WG (F)			*Distinct*	BASF
dicamba - 50% WG (F)	diflufenzopyr - 20% WG (F)			*Overdrive*	Engage Agro (BASF)
dicamba - 54% WG	clodinafop - 128 g/L EC	thifensulfuron:tribenuron - 7.7%:3.9% WG		*Harmony K*	E I duPont Canada
dicamba - 58.45% WG (F)	tribenuron - 8.25% WG (F)	2,4-D ester - 660g/L EC		*Triton K*	E. I. duPont Canada
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Sword*	Loveland Products
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Target*	Syngenta Crop Protection
dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Tracker XP*	IPCO
dicamba - 84 g/L SL (F)	MCPA K+ - 336 g/L SL (F)			*DyVel*	BASF Canada
dicamba - 87 g/L EC (F)	fluroxypyr - 113 g/L EC (F)			*Pulsar*	Syngenta Crop Protection
dicamba - 46 g/L (F)	glyphosate - 194 g/L SL (F)			*Glykamba*	Nufarm Agriculture
dichlobenil - 4% G				*Casoron*	Platform Specialty Products
dichlorprop - 300 g/L EC (F)	2,4-D Ester - 282 g/L EC (F)			*Dichlorprop-D*	IPCO
dichlorprop - 300 g/L EC (F)	2,4-D Ester - 282 g/L EC (F)			*Turboprop*	UAP
dichlorprop-P - 210 g/L EC (F)	2,4-D Ester - 400 g/L EC (F)			*Dichlorprop-DX*	IPCO
dichlorprop-P - 210 g/L EC (F)	2,4-D Ester - 400 g/L EC (F)			*Estaprop XT*	Nufarm Agriculture
dichlorprop-P - 310 g/L SL (F)	MCPA Amine - 160 g/L SL (F)	mecoprop-P - 130 g/L SL (F)		*Optica Trio*	UAP
diflufenzopyr - 20% WG (F)	dicamba - 50% WG (F)			*Distinct*	BASF
diflufenzopyr - 20% WG (F)	dicamba - 50% WG (F)			*Overdrive*	Engage Agro (BASF)
dimethanamid-P - 720g/L EC				*Frontier Max*	BASF Canada
dimethanamid-P - 720g/L EC				*Outlook*	BASF Canada
diquat - 240 g/L SL				*Desica*	Syngenta Crop Protection
diquat - 240 g/L SL / Engage Agro				*Diquash/Dessicash*	Great Northern Growers
diquat - 240 g/L SL				*Masterline Diquat*	Univar Canada
diquat - 240 g/L SL				*Reglone Desiccant*	Syngenta Crop Protection
diquat - 240 g/L SL				*Reglone Ion*	Syngenta Crop Protection
diquat - 240 g/L SL				*Reward*	True North
diquat - 240 g/L SL				*Stage*	Loveland Products
EPTC - 800 g/L EC				*Eptam-8E*	Gowan Company
ethalfluralin - 5% G				*Edge Granular*	Dow AgroSciences
ethametsulfron - 75% WG				*Muster Toss-N-Go*	E. I. duPont Canada
fenoxaprop-p - 120 g/L EC				*Bengal WB*	ADAMA Canada
fenoxaprop-P - 120 g/L EC				*Cordon*	Nufarm Agriculture
fenoxaprop-P - 120 g/L EC				*Cougar*	FMC of Canada
fenoxaprop-p - 120 g/L EC				*MPower HellCat*	Farmers of North America
fenoxaprop-p - 120 g/L EC				*Vigil WB*	IPCO
fenoxaprop-p - 120 g/L EC				*WildCat*	Loveland Products
fenoxaprop-p - 46 g/L EC (F)	bromoxynil - 87.5 g/L EC (F)	pyrasulfotole - 15.5 g/L EC (F)		*Tundra*	Bayer CropScience
fenoxaprop-p - 90 g/L EC				*Puma Advance*	Bayer CropScience
florasulam - 2.5 g/L SC (F)	fluroxypyr - 100 g/L SC (F)	MCPA ester - 600 g ae/L		*Outshine*	ADAMA Canada
florasulam - 2.5 g/L SC (F)	fluroxypyr - 100 g/L SC (F)	MCPA ester - 600 g/L		*Stellar*	Dow AgroSciences
florasulam - 20% WG (F)	hauloxifen - 20% WG (F)			*Paradigm*	Dow AgroSciences
florasulam - 25% WG	dicamba - 480 g/L SL			*Korrex*	Dow AgroSciences
florasulam - 4 g/L EC (F)	MCPA ester - 280 g/L EC (F)			*Frontline XL*	Dow AgroSciences
florasulam - 50 g/L SC	2,4-D Ester - 660 g/L EC			*Frontline 2,4-D XC*	Dow AgroSciences
florasulam - 50 g/L SC	clopyralid - 50 g/L EC (F)	MCPA Ester - 280 g/L EC (F)		*Spectrum*	Dow AgroSciences
florasulam - 50 g/L SC	glyphosate - 480 g/L SL			*PrePass XC*	Dow AgroSciences
florasulam - 50 g/L SC	MCPA Ester - 600 g/L EC			*Topline*	ADAMA Canada

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
florasulam - 50 g/L SC				*Blitz*	Loveland Products
florasulam - 50 g/L SC				*Mpower Battlefront*	Farmer sof North America
florasulam - 50 g/L SC				*Priority*	ADAMA Canada
florasulam - 50 g/L SC				*Spitfire*	FMC of Canada
florasulam - 7.7 g/L EC (F)	pinoxaden - 92.7 g/L EC (F)			*Broadband*	Syngenta Crop Protection
flucarbazone - 397 g/L SC				*Everest 2.0*	Arysta LifeScience
flucarbazone - 397 g/L SC				*Sierra 2.0*	Syngenta Crop Protection
flucarbazone - 45 %WG	thifensulfuron:tribenuron - 50%:25% SG			*Inferno Duo*	Arysta LifeScience
flucarbazone - 66% WG	fluroxypyr - 180 g/L EC			*Everest GBX*	Arysta LifeScience
flumioxazin - 51% WG				*Chateau*	Valent Canada
flumioxazin - 51% WG				*Valtera*	Valent Canada
fluroxypyr - 100 g/L SC (F)	florasulam - 2.5 g/L SC (F)	MCPA ester - 600 g ae/L		*Outshine*	ADAMA Canada
fluroxypyr - 100 g/L SC (F)	florasulam - 2.5 g/L SC (F)	MCPA ester - 600 g/L		*Stellar*	Dow AgroSciences
fluroxypyr - 113 g/L EC (F)	dicamba - 87 g/L EC (F)			*Pulsar*	Syngenta Crop Protection
fluroxypyr - 150 g/L SC (F)	thifensulfuron - 30 g/L SC (F)	metsulfuron - 3 g/L SC (F)		*Travallas*	E I duPont Canada
fluroxypyr - 180 g/L	imazamox - 120 g/L SL	MCPA ester - 600 g/L EC		*Altitude FX*	BASF Canada
fluroxypyr - 180 g/L	imazamox - 120 g/L SL			*Altitude FX2*	BASF Canada
fluroxypyr - 180 g/L	MCPA ester - 600 g/L EC			*Rush M*	ADAMA Canada
fluroxypyr - 180 g/L	MCPA ester - 600 g/L EC			*Trophy*	Nufarm Agriculture
fluroxypyr - 180 g/L EC	2,4-D Ester - 660 g/L EC			*Flurox-24*	Nufarm Agriculture
fluroxypyr - 180 g/L EC	2,4-D Ester - 660 g/L EC			*Rush 24*	ADAMA Canada
fluroxypyr - 180 g/L EC	flucarbazone - 66% WG			*Everest GBX*	Arysta LifeScience
fluroxypyr - 180 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG	2,4-D Ester - 564 g/L EC		*Retain SG*	Loveland Products
fluroxypyr - 217 g/L EC (F)	clodinafop - 112 g/L (F)	thifensulfuron:tribenuron - 50%:25% SG		*Signal FSU*	Nufarm Agriculture
fluroxypyr - 250 g/L EC(F)	MCPA ester - 600 g/L EC	hauloxifen - 16.2 g/L EC (F)		*Pixxaro*	Dow AgroSciences
fluroxypyr - 333 g/L EC	2,4-D E - 660 g/L EC			*Attain XC*	Dow AgroSciences
fluroxypyr - 333 g/L EC	clopyralid - 50 g/L EC (F)	MCPA Ester - 280 g/L EC (F)		*Prestige XC*	Dow AgroSciences
fluroxypyr - 333 g/L EC	pyroxsulam - 30 g/L OD			*Tandem*	Dow AgroSciences
fluroxypyr - 333 g/L EC	thifensulfuron:tribenuron - 50%:50% SG	thiencarbazone - 10 g/L SC	MCPA ester - 600 g/L EC	*Predicade*	E I duPont Canada
fluroxypyr - 333 g/L EC	thifensulfuron:tribenuron - 50%:50% SG			*Barricade II*	E I duPont Canada
fluroxypyr - 61 g/L EC (F)	MCPA Ester - 224 g/L EC (F)	clopyralid - 61 g/L EC (F)		*Hat Trick*	Loveland Products
fluroxypyr - 80 g/L EC (F)	2,4-D Ester - 240 g/L EC (F)	bromoxynil - 90 g/L EC (F)		*Enforcer D*	Nufarm Agriculture
fluroxypyr - 80 g/L EC (F)	bromoxynil - 200 g/L EC (F)	MCPA ester - 200 g/L EC (F)	thifensulfuron:tribenuron - 50%:25% SG	*Enforcer MSU*	Nufarm Agriculture
fluroxypyr - 80 g/L EC (F)	MCPA - 200 g/L EC (F)	bromoxynil - 200g/L EC (F)		*Enforcer M*	Nufarm Agriculture
fluroxypyr - 87.5 g/L EC (F)	pinoxaden - 50 g/L EC (F)			*Axial Xtreme*	Syngenta Crop Protection
fluroxypyr - 90 g/L EC (F)	2,4-D Ester - 360 g/L EC (F)			*OcTTain XL*	Dow AgroSciences
fluroxypyr - 90 g/L EC (F2)	2,4-D Ester - 360 g/L EC (F2)	pinoxaden - 25 g/L EC (F1)	clodinafop - 25 g/L EC (F1)	*TraxosTwo*	Syngenta Crop Protection
fluroxypyr - 90 g/L EC (F)	clopyralid - 90g/L SL (F)			*Momentum*	Loveland Products
fomesafen - 240 g/L SL				*Reflex*	Syngenta Crop Protection
fomesafen - 67 g/L SL (F)	glyphosate - 271 g/L SL (F)			*FlexStar GT*	Syngenta Crop Protection
foramsulfuron - 22.5 g/L OD				*Option 2.25 OD*	Bayer CropScience
foramsulfuron - 35% WG				*Option 35 DF*	Bayer CropScience
glufosinate - 150 g/L SL				*GoodHarvest*	Farmers of North America
glufosinate - 150 g/L SL				*Liberty 150 SN*	Bayer CropScience
glufosinate - 200 g/L SL				*Liberty 200 SN*	Bayer CropScience
glyphosate - 194 g/L SL (F)	dicamba - 46 g/L (F)			*Glykamba*	Nufarm Agriculture
glyphosate - 271 g/L SL (F)	fomesafen - 67 g/L SL (F)			*FlexStar GT*	Syngenta Crop Protection
glyphosate - 356 g/L SL	carfentrazone - 240 g/L EC			*Cleanstart*	Nufarm Agriculture
glyphosate - 356 g/L SL				*Cheminova Glyphosate*	FMC of Canada
glyphosate - 356 g/L SL				*Sharpshooter*	Loveland Products
glyphosate - 356 g/L SL				*Wise-Up*	Adjuvants Plus
glyphosate - 360 g/L SL				*ClearOut 41 Plus*	Farmers of North America

(Component 1) Active Ingredient[a] - Formulation	(Component 2) Active Ingredient[a] - Formulation	(Component 3) Active Ingredient[a] - Formulation	(Component 4) Active Ingredient[a] - Formulation	Product	Company
glyphosate - 360 g/L SL				*Crush'R Plus*	AgriStar
glyphosate - 360 g/L SL				*Glyfos*	FMC of Canada
glyphosate - 360 g/L SL				*Lajj Plus*	Ray Glenn Commodities
glyphosate - 360 g/L SL				*MPower Glyphosate*	Farmers of North America
glyphosate - 360 g/L SL				*Sharpshooter Plus*	Loveland Products
glyphosate - 360 g/L SL				*Smoke*	Great Northern Growers
glyphosate - 450 g/L SL				*Credit 45*	Nufarm Agriculture
glyphosate - 480 g/L SL	clopyralid - 360 g/L SL			*Eclipse III*	Dow AgroSciences
glyphosate - 480 g/L SL	florasulam - 50 g/L SC			*PrePass XC*	Dow AgroSciences
glyphosate - 480 g/L SL				*Glyphosate 480*	Albaugh
glyphosate - 480 g/L SL				*Matrix*	IPCO
glyphosate - 480 g/L SL				*Maverick III*	Dow AgroSciences
glyphosate - 480 g/L SL				*Vantage Plus Max II*	Dow AgroSciences
glyphosate - 480 g/L SL				*Vector*	Federated Coop
glyphosate - 500 g/L SL				*Touchdown Total*	Syngenta Crop Protection
glyphosate - 500 g/L SL				*Traxion*	Syngenta Crop Protection
glyphosate - 540 g/L SL				*Crush'R 540*	AgriStar
glyphosate - 540 g/L SL				*R/T 540*	Monsanto
glyphosate - 540 g/L SL				*Roundup Transorb HC*	Monsanto
glyphosate - 540 g/L SL				*Roundup Ultra 2*	Monsanto
glyphosate - 540 g/L SL				*Roundup WeatherMax*	Monsanto
glyphosate - 540 g/L SL				*Start Up*	Loveland Products
glyphosate - 540 g/L SL				*Vector 540*	Federated Coop
halosulfuron - 72.6% WG				*Permit*	Gowan Canada
hauloxifen - 16.2 g/L EC (F)	fluroxypyr - 250 g/L EC(F)	MCPA ester - 600 g/L EC		*Pixxaro*	Dow AgroSciences
hauloxifen - 20% WG (F)	florasulam - 20% WG (F)			*Paradigm*	Dow AgroSciences
hexazinone - 75% WG				*Velpar DF CU*	Tessenderlo Kerley Inc.
imazamethabenz - 300 g/L SC				*Assert 300 SC*	Nufarm Agriculture
imazamethabenz - 300 g/L SC				*Avert*	Loveland Products
imazamox - 120 g/L SL	fluroxypyr - 180 g/L	MCPA ester - 600 g/L EC		*Altitude FX*	BASF Canada
imazamox - 120 g/L SL	fluroxypyr - 180 g/L			*Altitude FX2*	BASF Canada
imazamox - 20 g/L SL (F)	bentazon - 429 g/L SL (F)			*Viper ADV*	BASF Canada
imazamox - 33 g/L SL (F)	imazapyr - 15 g/L SL (F)	clopyralid - 75% WG		*Salute*	Dow AgroSciences
imazamox - 33 g/L SL (F)	imazapyr - 15 g/L SL (F)			*Ares*	BASF Canada
imazamox - 35% WG (F)	imazethapyr - 35% WG (F)	sethoxydim - 450 g/L EC		*Odyssey Ultra*	BASF Canada
imazamox - 35% WG (F)	imazethapyr - 35% WG (F)			*Odyssey*	BASF Canada
imazamox - 70% WG	clopyralid - 75% WG			*Tensile*	BASF Canada
imazamox - 70% WG				*Solo*	BASF Canada
imazapyr - 15 g/L SL (F)	imazamox - 33 g/L SL (F)			*Ares*	BASF Canada
imazapyr - 15 g/L SL (F)	imazamox - 33 g/L SL (F)			*Salute*	Dow AgroSciences
imazethapyr - 240 g/L SL				*Gladiator*	Univar Canada
imazethapyr - 240 g/L SL				*MPower Kamikaze*	Farmers of North America
imazethapyr - 240 g/L SL				*MultiStar*	Loveland Products
imazethapyr - 240 g/L SL				*Phantom*	ADAMA Canada
imazethapyr - 240 g/L SL				*Pursuit*	BASF Canada
imazethapyr - 35% WG (F)	imazamox - 35% WG (F)	sethoxydim - 450 g/L EC		*Odyssey Ultra*	BASF Canada
imazethapyr - 35% WG (F)	imazamox - 35% WG (F)			*Odyssey*	BASF Canada
linuron - 400 g/L SC				*Linuron 400*	UAP
linuron - 480 g/L SC				*Lorox L*	Tessenderlo Kerley Inc.
MCPA - 200 g/L EC (F)	bromoxynil - 200g/L EC (F)	fluroxypyr - 80 g/L EC (F)		*Enforcer M*	Nufarm Agriculture
MCPA Amine - 160 g/L SL (F)	mecoprop-P - 130 g/L SL (F)	dichlorprop-P - 310 g/L SL (F)		*Optica Trio*	UAP
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)		*Sword*	Loveland Products
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)		*Target*	Syngenta Crop Protection
MCPA amine - 275 g/L SL (F)	dicamba - 62.5 g/L SL (F)	mecoprop-P - 62.5 g/L SL (F)		*Tracker XP*	IPCO
MCPA Amine - 500, 600 g/L SL				*MCPA Amine*	Various
MCPA ester - 200 g/L EC (F)	bromoxynil - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	thifensulfuron:tribenuron - 50%:25% SG	*Enforcer MSU*	Nufarm Agriculture
MCPA Ester - 224 g/L EC (F)	clopyralid - 61 g/L EC (F)	fluroxypyr - 61 g/L EC (F)		*Hat Trick*	Loveland Products
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Badge*	ADAMA Canada

(Component 1) Active Ingredient[1] - Formulation	(Component 2) Active Ingredient[1] - Formulation	(Component 3) Active Ingredient[1] - Formulation	(Component 4) Active Ingredient[1] - Formulation	Product	Company
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Logic M*	IPCO
MCPA Ester - 225 g/L EC (F)	bromoxynil - 225 g/L EC (F)			*Mextrol 450*	Nufarm Agriculture
MCPA Ester - 280 g/L EC (F)	bromoxynil - 280 g/L EC (F)			*Buctril M*	Bayer CropScience
MCPA Ester - 280 g/L EC (F)	clopyralid - 50 g/L EC (F)			*Curtail M*	Nufarm Agriculture
MCPA ester - 280 g/L EC (F)	florasulam - 4 g/L EC (F)			*Frontline XL*	Dow AgroSciences
MCPA Ester - 280 g/L EC (F)	florasulam - 50 g/L SC	clopyralid - 50 g/L EC (F)		*Spectrum*	Dow AgroSciences
MCPA Ester - 280 g/L EC (F)	fluroxypyr - 333 g/L EC	clopyralid - 50 g/L EC (F)		*Prestige XC*	Dow AgroSciences
MCPA ester - 500 or 600 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG			*BroadSide*	Loveland Products
MCPA Ester - 500 or 600 g/L EC	thifensulfuron:tribenuron - 33.3%:16.7% SG			*Refine M*	E. I. duPont Canada
MCPA Ester - 500, 600 g/L EC				*MCPA Ester*	Various
MCPA ester - 600 g ae/L	florasulam - 2.5 g/L SC (F)	fluroxypyr - 100 g/L SC (F)		*Outshine*	ADAMA Canada
MCPA ester - 600 g/L	florasulam - 2.5 g/L SC (F)	fluroxypyr - 100 g/L SC (F)		*Stellar*	Dow AgroSciences
MCPA Ester - 600 g/L EC	florasulam - 50 g/L SC			*Topline*	ADAMA Canada
MCPA ester - 600 g/L EC	fluroxypyr - 180 g/L			*Rush M*	ADAMA Canada
MCPA ester - 600 g/L EC	fluroxypyr - 180 g/L			*Trophy*	Nufarm Agriculture
MCPA ester - 600 g/L EC	hauloxifen - 16.2 g/L EC (F)	fluroxypyr - 250 g/L EC(F)		*Pixxaro*	Dow AgroSciences
MCPA ester - 600 g/L EC	imazamox - 120 g/L SL	fluroxypyr - 180 g/L		*Altitude FX*	BASF Canada
MCPA ester - 600 g/L EC	thifensulfuron:tribenuron - 50%:50% SG	fluroxypyr - 333 g/L EC	thiencarbazone - 10 g/L SC	*Predicade*	E I duPont Canada
MCPA K+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			*Topside*	Loveland Products
MCPA K+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			*Tropotox Plus*	Nufarm Agriculture
MCPA K+ - 336 g/L SL (F)	dicamba - 84 g/L SL (F)			*DyVel*	BASF Canada
MCPA K+ - 400 g/L SL				*MCPA K+*	Various
MCPA Na+ - 300 g/L SL				*MCPA Na*	Various
MCPA Na+ - 25 g/L SL (F)	MCPB - 375 g/L SL (F)			*Clovitex Plus*	IPCO
MCPB - 375 g/L SL (F)	MCPA K+ - 25 g/L SL (F)			*Topside*	Loveland Products
MCPB - 375 g/L SL (F)	MCPA K+ - 25 g/L SL (F)			*Tropotox Plus*	Nufarm Agriculture
MCPB - 375 g/L SL (F)	MCPA Na+ - 25 g/L SL (F)			*Clovitex Plus*	IPCO
mecoprop-P - 130 g/L SL (F)	MCPA Amine - 160 g/L SL (F)	dichlorprop-P - 310 g/L SL (F)		*Optica Trio*	UAP
mecoprop-P - 150 g/L SL				*Mecoprop-P*	UAP
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Sword*	Loveland Products
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Target*	Syngenta Crop Protection
mecoprop-P - 62.5 g/L SL (F)	dicamba - 62.5 g/L SL (F)	MCPA amine - 275 g/L SL (F)		*Tracker XP*	IPCO
mecoprop-P - 80 g/L SL (F)	dicamba - 110 g/L SL (F)	2,4-D Amine - 295 g/L SL (F)		*DyVel DSp*	BASF Canada
metolachlor - 915 g/L EC	rimsulfuron - 25% WG	dicamba - 480 g/L SL		*Battalion*	E. I. duPont Canada
metolachlor - 400 g/L SC (F)	atrazine - 320 g/L SC (F)			*Primextra II Magnum*	Syngenta Crop Protection
metolachlor - 915 g/L EC				*Dual II Magnum*	Syngenta Crop Protection
metribuzin - 75% WG				*Sencor*	Bayer CropScience
metribuzin - 75% WG				*TriCor*	United Phosphorus Inc.
metsulfuron - 3 g/L SC (F)	thifensulfuron - 30 g/L SC (F)	fluroxypyr - 150 g/L SC (F)		*Travallas*	E I duPont Canada
metsulfuron - 60% WG				*Accurate*	FMC of Canada
metsulfuron - 60% WG				*Escort*	E.I. duPont Canada
metsulfuron - 60% SG				*Ally Toss-N-Go*	E. I. duPont Canada
metsulfuron - 8.6% SG (B)	tribenuron - 42.9% SG (B)			*Express Pro*	E.I. duPont Canada
metsulfuron - 8.6% SG (B)	tribenuron - 42.9% SG (B)			*Nuance Pro*	FMC of Canada
metsulfuron - 9.45% WG (F)	aminopyralid - 52.5% WG (F)	2,4-D Ester - 564 g/L EC		*Reclaim*	Dow AgroSciences
nicosulfuron - 37.5% WG (F)	rimsulfuron - 37.5% WG (F)			*Ultim*	E.I. duPont Canada
nicosulfuron - 75% WG				*Accent*	E. I. duPont Canada
paraquat - 200 g/L SL				*Gramoxone*	Syngenta Crop Protection
picloram - 240 g/L SL				*Tordon 22K*	Dow AgroSciences
picloram - 65:240 g/L SL (F)	2,4-D Ester - 240 g/L SL (F)			*Grazon*	Dow AgroSciences
picloram - 97.5 g/L SL (F)	2,4-D Ester - 360 g/L SL (F)			*Grazon XC*	Dow AgroSciences
pinoxaden - 25 g/L EC (F)	clodinafop - 25 g/L EC (F)			*Traxos*	Syngenta Crop Protection
pinoxaden - 25 g/L EC (F1)	clodinafop - 25 g/L EC (F1)	fluroxypyr - 90 g/L EC (F2)	2,4-D Ester - 360 g/L EC (F2)	*TraxosTwo*	Syngenta Crop Protection
pinoxaden - 50 g/L EC	pyrasulfotole - 37.5 g/L EC (F)	bromoxynil - 210 g/L EC (F)		*Axial iPak*	Syngenta Crop Protection
pinoxaden - 50 g/L EC (F)	fluroxypyr - 87.5 g/L EC (F)			*Axial Xtreme*	Syngenta Crop Protection
pinoxaden - 50g/L EC				*Axial BIA*	Syngenta Crop Protection

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
pinoxaden - 92.7 g/L EC (F)	florasulam - 7.7 g/L EC (F)			*Broadband*	Syngenta Crop Protection
propyzamide - 400 g/L SC				*Kerb SC*	Dow AgroSciences
propyzamide - 50% WSP				*Kerb 50WSP*	Dow AgroSciences
pyrasulfotole - 15.5 g/L EC (F)	fenoxaprop-p - 46 g/L EC (F)	bromoxynil - 87.5 g/L EC (F)		*Tundra*	Bayer CropScience
pyrasulfotole - 31.3 g/L EC (F)	thiencarbazone - 5 g/L SC (F)	bromoxynil - 175 g/L EC (F)		*Velocity m3*	Bayer CropScience
pyrasulfotole - 37.5 g/L EC (F)	bromoxynil - 210 g/L EC (F)			*Infinity*	Bayer CropScience
pyrasulfotole - 37.5 g/L EC (F)	pinoxaden - 50 g/L EC	bromoxynil - 210 g/L EC (F)		*Axial iPak*	Syngenta Crop Protection
pyroxasulfone - 85% WG	carfentrazone - 240 g/L EC			*Focus*	FMC of Canada
pyroxsulam - 21.5% WG				*Simplicity GoDRI*	Dow AgroSciences
pyroxsulam - 30 g/L OD	fluroxypyr - 333 g/L EC			*Tandem*	Dow AgroSciences
pyroxsulam - 30 g/L SC				*Simplicity*	Dow AgroSciences
quinclorac - 51.55% SG (B)	thifensulfuron:tribenuron - 10.3%:5.2% SG (B)			*Triton C*	E. I. duPont Canada
quinclorac - 75% DF				*Clever*	Great Northern Growers
quinclorac - 75% DF				*Masterline Quinclorac*	Univar Canada
quizalofop-p - 96 g/L EC				*Assure II*	E. I. duPont Canada
quizalofop-p - 96 g/L EC				*Yuma GL*	Gowan Canada
rimsulfuron - 25% WG				*Prism SG*	E.I. DuPont Canada
rimsulfuron - 25% WG	metalachlor - 915 g/L EC	dicamba - 480 g/L SL		*Battalion*	E. I. duPont Canada
rimsulfuron - 37.5% WG (F)	nicosulfuron - 37.5% WG (F)			*Ultim*	E.I. duPont Canada
saflufenacil - 342 g/L SC				*Heat LQ*	BASF Canada
saflufenacil - 70% SG				*Heat WG*	BASF Canada
sethoxydim - 450 g/L EC	imazamox - 35% WG (F)	imazethapyr - 35% WG (F)		*Odyssey Ultra*	BASF Canada
sethoxydim - 450 g/L EC				*Poast Ultra*	BASF Canada
simazine - 480 g/L SC				*Simazine 480*	Loveland Products
simazine - 90% WG				*Princep Nine T*	True North
sulfentrazone - 480 g/L SC	carfentrazone - 240 g/L EC			*Authority Charge*	FMC of Canada
sulfentrazone - 480 g/L SC				*Authority*	FMC of Canada
thiencarbazone - 10 g/L SC	fluroxypyr - 333 g/L EC	thifensulfuron:tribenuron - 50%:50% SG	MCPA ester - 600 g/L EC	*Predicade*	E I duPont Canada
thiencarbazone - 10 g/L SC				*Varro*	Bayer CropScience
thiencarbazone - 5 g/L SC (F)	pyrasulfotole - 31.3 g/L EC (F)	bromoxynil - 175 g/L EC (F)		*Velocity m3*	Bayer CropScience
thifensulfuron - 30 g/L SC (F)	fluroxypyr - 150 g/L SC (F)	metsulfuron - 3 g/L SC (F)		*Travallas*	E I duPont Canada
thifensulfuron - 50% SG				*Pinnacle SG*	E. I. duPont Canada
thifensulfuron:tribenuron - 10.3%:5.2% SG (B)	quinclorac - 51.55% SG (B)			*Triton C*	E. I. duPont Canada
thifensulfuron:tribenuron - 33.3%:16.7% SG	clodinafop - 128 g/L EC			*Harmony SG*	E. I. duPont Canada
thifensulfuron:tribenuron - 33.3%:16.7% SG	fluroxypyr - 180 g/L EC	2,4-D Ester - 564 g/L EC		*Retain SG*	Loveland Products
thifensulfuron:tribenuron - 33.3%:16.7% SG	MCPA ester - 500 or 600 g/L EC			*BroadSide*	Loveland Products
thifensulfuron:tribenuron - 33.3%:16.7% SG	MCPA Ester - 500 or 600 g/L EC			*Refine M*	E. I. duPont Canada
thifensulfuron:tribenuron - 33.3%:16.7% SG				*Refine SG*	E. I. duPont Canada
thifensulfuron:tribenuron - 50%:25% SG	flucarbazone - 45 %WG			*Inferno Duo*	Arysta LifeScience
thifensulfuron:tribenuron - 50%:25% SG	bromoxynil - 200 g/L EC (F)	MCPA ester - 200 g/L EC (F)	fluroxypyr - 80 g/L EC (F)	*Enforcer MSU*	Nufarm Agriculture
thifensulfuron:tribenuron - 50%:25% SG	clodinafop - 112 g/L (F)	fluroxypyr - 217 g/L EC (F)		*Signal FSU*	Nufarm Agriculture
thifensulfuron:tribenuron - 50%:25% SG (F)				*Deploy*	Arysta LifeScience
thifensulfuron:tribenuron - 50%:25% SG (F)				*MPower R*	Farmers of North America
thifensulfuron:tribenuron - 50%:25% SG (F)				*Nimble*	FMC of Canada

(Component 1) Active Ingredient[a] - Formulation	(Component 2) Active Ingredient[a] - Formulation	(Component 3) Active Ingredient[a] - Formulation	(Component 4) Active Ingredient[a] - Formulation	Product	Company
thifensulfuron:tribenuron - 50%:50% SG	fluroxypyr - 333 g/L EC	thiencarbazone - 10 g/L SC	MCPA ester - 600 g/L EC	*Predicade*	E I duPont Canada
thifensulfuron:tribenuron - 50%:50% SG (F)	fluroxypyr - 333 g/L EC			*Barricade II*	E I duPont Canada
thifensulfuron:tribenuron - 7.7%:3.9% WG (B)	clodinafop - 128 g/L EC	dicamba - 54% WG (B)		*Harmony K*	E I duPont Canada
topremazone - 336 g/L SC				*Armezon*	BASF
topremazone - 336 g/L SC				*Impact*	UAP
tralkoxydim - 400 g/L SC				*Achieve (Liquid Achieve)*	Dow AgroSciences
tralkoxydim - 400 g/L SC				*Bison*	ADAMA Canada
tralkoxydim - 400 g/L SC				*Marengo*	Dow AgroSciences
tralkoxydim - 400 g/L SC				*Nufarm Tralkoxydim*	Nufarm Agriculture
triallate - 10% G				*Avadex MinTill*	Gowan Canada
triallate - 10% G (F)	trifluralin - 4% G (F)			*Fortress*	Gowan Canada
triallate - 480 g/L EC				*Avadex Extra Strength BW*	Gowan Canada
tribenuron - 42.9% SG (B)	metsulfuron - 8.6% SG (B)			*Express Pro*	E.I. duPont Canada
tribenuron - 42.9% SG (B)	metsulfuron - 8.6% SG (B)			*Nuance Pro*	FMC of Canada
tribenuron - 50% SG				*Express SG*	E. I. duPont Canada
tribenuron - 75% WG	2,4-D ester - 660 g/L EC			*Ko-Act*	Nufarm Agriculture
tribenuron - 75% WG				*Inferno*	Arysta LifeScience
tribenuron - 75% WG				*MPower X*	Farmers of North America
tribenuron - 75% WG				*Nuance*	FMC of Canada
tribenuron - 75% WG				*Spike*	Nufarm Agriculture
tribenuron - 8.25% WG (F)	dicamba - 58.45% WG (F)	2,4-D ester - 660g/L EC		*Triton K*	E. I. duPont Canada
tribenuron - 50% SG	dicamba - 480 g/L SL			*Express FX*	E.I. duPont Canada
trifluralin - 10% G				*Bonanza 10G*	UAP
trifluralin - 10% G				*Rival 10G*	Nufarm Agriculture
trifluralin - 4% G (F)	triallate - 10% G (F)			*Fortress*	Gowan Canada
trifluralin - 480 g/L EC				*Bonanza 480 Liquid*	UAP
trifluralin - 480 g/L EC				*Treflan*	Dow AgroSciences
trifluralin - 500 g/L EC				*Rival EC*	Nufarm Agriculture

Foliar Fungicides

(Component 1) Active Ingredient[a] - Formulation	(Component 2) Active Ingredient[a] - Formulation	(Component 3) Active Ingredient[a] - Formulation	(Component 4) Active Ingredient[a] - Formulation	Product	Company
ametoctradin - 300 g/L SC	dimethomorph - 225 g/L SC			*Zampro*	BASF Canada
azoxystrobin - 250 g/L WG	benzovindiflupyr - 100 g/L WG			*Elatus*	Syngenta Crop Protection
azoxystrobin - 200 g/L SC	difenconazole - 125 g/L SC			*Quadris Top*	Syngenta Crop Protection
azoxystrobin - 225 g/L SC	difenconazole - 225 g/L SC			*Exempla*	Syngenta Crop Protection
azoxystrobin - 143 g/L SC	propiconazole - 124 g/L SC			*Topnotch*	ADAMA Canada
azoxystrobin - 75 g/L SC	propiconazole - 125 g/L SC			*Quilt*	Syngenta Crop Protection
azoxystrobin - 250 g/L SC				*Quadris*	Syngenta Crop Protection
azoxystrobin - 250 g/L SC				*ADAMA Azoxystrobin*	ADAMA Canada
Bacillus subtilis - 14.6% WP				*Serenade Max*	Bayer CropScience
Bacillus subtilis - 1.34% SC				*Serenade CPB*	Bayer CropScience
benzovindiflupyr - 100 g/L WG	azoxystrobin - 250 g/L WG			*Elatus*	Syngenta Crop Protection
boscalid - 70% WG	pyraclostrobin - 250 g/L EC			*Lance AG*	BASF Canada
boscalid - 70% WG				*Cantus WDG*	BASF Canada
boscalid - 70% WG				*Lance WDG*	BASF Canada
chlorothalonil - 375 g/L SC	propamocarb HCl - 375 g/L SC			*Tattoo C*	Bayer CropScience
chlorothalonil - 500 g/L SC (DC)	metalaxyl - 480 g/L EC (DC)			*Ridomil Gold / Bravo*	Syngenta Crop Protection
chlorothalonil - 500 g/L SC (DC)	metalaxyl - 480 g/L SL (DC)			*Ridomil Gold SL / Bravo*	Syngenta Crop Protection

(Component 1) Active Ingredient[1] - Formulation	(Component 2) Active Ingredient[1] - Formulation	(Component 3) Active Ingredient[1] - Formulation	(Component 4) Active Ingredient[1] - Formulation	Product	Company
chlorothalonil - 500 g/L SC				*Bravo 500*	Syngenta Crop Protection
chlorothalonil - 500 g/L SC				*Bravo ZN*	Syngenta Crop Protection
chlorothalonil - 720 g/L SC				*Echo 720*	UAP
chlorothalonil - 90% WG				*Echo 90DF*	UAP
Coniothyrium minitans - 5.3% WG				*Contans WG*	Bayer CropScience
copper hydroxide - 50% WG				*Parasol WG*	Nufarm Agriculture
copper octanoate - 1.8% SL				*Cueva*	Engage Agro
copper sulphate / copper oxychloride - 53% WP				*Copper 53W*	Loveland Products
copper sulphate / copper oxychloride - 50% WP				*Copper Spray*	Loveland Products
cyazofamid - 400 g/L SC				*Ranman 400SC*	UAP
cymoxanil - 25% WG	famoxadone - 25% WG			*Tanos 50F*	E.I. duPont Canada
cymoxanil - 60% WG				*Curzate 60DF*	E.I. duPont Canada
cyprodinil - 37.5% WG	fludioxonil - 25% WG			*Astound*	Syngenta Crop Protection
difenconazole - 125 g/L SC	azoxystrobin - 200 g/L SC			*Quadris Top*	Syngenta Crop Protection
difenconazole - 250 g/L EC	mandipropamid - 250 g/L SC			*Revus Top*	Syngenta Crop Protection
difenconazole - 225 g/L SC	azoxystrobin - 225 g/L SC			*Exempla*	Syngenta Crop Protection
difenconazole - 250 g/L EC				*Inspire*	Syngenta Crop Protection
dimethomorph - 225 g/L SC	ametoctradin - 300 g/L SC			*Zampro*	BASF Canada
dimethomorph - 50% WP				*Acrobat 50WP*	BASF Canada
famoxadone - 25% WG	cymoxanil - 25% WG			*Tanos 50F*	E.I. duPont Canada
fenamidone - 500 g/L SC				*Reason 500SC*	Bayer CropScience
fluazinam - 40% SC				*Allegro 500F*	Syngenta Crop Protection
fludioxonil - 25% WG	cyprodinil - 37.5% WG			*Astound*	Syngenta Crop Protection
fluopyram - 125 g/L SC	pyrimethanil - 375 g/L SC			*Luna Tranquility*	Bayer CropScience
fluopyram - 200 g/L SC	prothioconazole - 200 g/L SC			*Propulse*	Bayer CropScience
flutriafol - 125.08 g/L SC				*Fullback 125 SC*	FMC of Canada
fluxapyroxad - 167 g/L SC	pyraclostrobin - 333 g/L SC			*Priaxor*	BASF Canada
iprodione - 240 g/L SC				*Rovral Flo*	FMC of Canada
iprodione - 240 g/L SC				*Overall 240SC*	ADAMA Canada
mancozeb - 66.7% WG	zoxamide - 8.43% WG			*Gavel 75DF*	Gowan Canada
mancozeb - 75% WG				*Kingpin 75WDG*	FMC of Canada
mancozeb - 75% WG				*Dithane Rainshield*	Dow AgroSciences
mancozeb - 75% WG				*Manzate Pro-Stick*	United Phosphorus Inc.
mancozeb - 75% WG				*Penncozeb 75DF*	United Phosphorus Inc.
mandipropamid - 250 g/L SC	difenconazole - 250 g/L EC			*Revus Top*	Syngenta Crop Protection
mandipropamid - 250 g/L SC				*Revus*	Syngenta Crop Protection
metalaxyl - 480 g/L EC (DC)	chlorothalonil - 500 g/L SC (DC)			*Ridomil Gold / Bravo*	Syngenta Crop Protection
metalaxyl - 480 g/L SL (DC)	chlorothalonil - 500 g/L SC (DC)			*Ridomil Gold SL / Bravo*	Syngenta Crop Protection
metalaxyl - 480 g/L EC				*Ridomil Gold 480 EC*	Syngenta Crop Protection
metalaxyl - 480 g/L SL				*Ridomil Gold 480 SL*	Syngenta Crop Protection
metconazole - 80 g/L EC (F)	pyraclostrobin - 130 g/L EC (F)			*Twinline*	BASF Canada
metconazole - 90 g/L EC				*Caramba*	BASF Canada
metconazole - 50% WG				*Quash*	Valent Canada
metiram - 55% WG	pyraclostrobin - 5% WG			*Cabrio Plus*	BASF Canada
metiram - 80% WG				*Polyram DF*	BASF Canada
mono/di-potassium salts of phosphorous acid - 53% SL				*Confine Extra*	Winfield Solutions
penthiopyrad - 200 g/L SC				*Fontelis*	E.I. duPont Canada
penthiopyrad - 200 g/L EC				*Vertisan*	E.I. duPont Canada
picoxystrobin - 250 g/L SC				*Acapela*	E.I. duPont Canada
propamocarb HCl - 375 g/L SC	chlorothalonil - 375 g/L SC			*Tattoo C*	Bayer CropScience
propiconazole - 124 g/L SC	azoxystrobin - 143 g/L SC			*Topnotch*	ADAMA Canada
propiconazole - 125 g/L SC	azoxystrobin - 75 g/L SC			*Quilt*	Syngenta Crop Protection
propiconazole - 250 g/L EC				*Tilt 250E*	Syngenta Crop Protection
propiconazole - 418 g/L EC				*Bumper 418EC*	ADAMA Canada
propiconazole - 418 g/L EC				*Pivot 418EC*	IPCO
propiconazole - 250 g/L EC				*Propel*	Syngenta Crop Protection

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
propiconazole - 418 g/L EC				*Nufarm Propiconazole*	Nufarm Agriculture
prothioconazole - 200 g/L SC	fluopyram - 200 g/L SC			*Propulse*	Bayer CropScience
prothioconazole - 125 g/L EC	tebuconazole - 125 g/L EC			*Prosaro 250EC*	Bayer CropScience
prothioconazole - 175 g/L SC	trifloxystrobin - 150 g/L SC			*Delaro*	Bayer CropScience
prothioconazole - 480 g/L SC				*Proline 480SC*	Bayer CropScience
pyraclostrobin - 5% WG	metiram - 55% WG			*Cabrio Plus*	BASF Canada
pyraclostrobin - 130 g/L EC	metconazole - 80 g/L EC			*Twinline*	BASF Canada
pyraclostrobin - 250 g/L EC	boscalid - 70% WG			*Lance AG*	BASF Canada
pyraclostrobin - 333 g/L SC	fluxapyroxad - 167 g/L SC			*Priaxor*	BASF Canada
pyraclostrobin - 250 g/L EC				*Headline*	BASF Canada
pyrimethanil - 375 g/L SC	fluopyram - 125 g/L SC			*Luna Tranquility*	Bayer CropScience
pyrimethanil - 400 g/L SC				*Scala SC*	Bayer CropScience
Reynoutria sachalinensis - 20% SC				*Regalia Maxx*	Marrone Bio Innovations
sodium/potassium/ammonium phosphites - 53.6% SL				*Phostrol*	Engage Agro
tebuconazole - 125 g/L EC	prothioconazole - 125 g/L EC			*Prosaro 250EC*	Bayer CropScience
tebuconazole - 432 g/L SC				*Folicur 432F*	Bayer CropScience
tebuconazole - 250 g/L EW				*Folicur 250EW*	Bayer CropScience
tebuconazole - 432 g/L SC				*Palliser*	Bayer CropScience
tebuconazole - 432 g/L SC				*Fuse*	Syngenta Crop Protection
thiophanate-methyl - 70% WP				*Senator 70WP*	Engage Agro
trifloxystrobin - 150 g/L SC	prothioconazole - 175 g/L SC			*Delaro*	Bayer CropScience
zoxamide - 8.43% WG	mancozeb - 66.7% WG			*Gavel 75DF*	Gowan Canada

Seed Treatments

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
azoxystrobin - 143 g/L SC	difenconazole - 112 g/L SC	fludioxonil - 143 g/L SC		*Stadium*	Syngenta Crop Protection
azoxystrobin - 1.33% FS	fludioxonil - 3.32% FS	metalaxyl-m+s - 2.65% FS	thiabendizole - 26.5% FS	*Maxim Quattro*	Syngenta Crop Protection
captan - 30% FS				*Agrox FL*	Norac Concepts
carbathiin - 50 g/L FS	clothianidin - 285.7 g/L FS	metalaxyl - 5.36 g/L FS	trifloxystrobin - 7.14 g/L FS	*Prosper FX*	Bayer CropScience
carbathiin - 47.6 g/L FS	imidacloprid - 285 g/L FS	thiram - 95.3 g/L FS		*Gaucho CS FL*	Bayer CropScience
carbathiin - 87.5 g/L FS	ipconazole - 9.38 g/L FS			*Rancona RS*	Platform Specialty Products
carbathiin - 92 g/L LS	thiabendazole - 58 g/L LS			*Crown*	Platform Specialty Products
carbathiin - 15.59% FS	thiram - 13.25% FS			*Vitaflo 280*	Platform Specialty Products
carbathiin - 15.59% FS	thiram - 13.25% FS			*Vitaflo SP Fungicide*	IPCO
carbathiin - 15.59% FS	thiram - 13.25% FS			*Vitaflo Fungicide*	IPCO
clothianidin - 285.7 g/L FS	carbathiin - 50 g/L FS	metalaxyl - 5.36 g/L FS	trifloxystrobin - 7.14 g/L FS	*Prosper FX*	Bayer CropScience
clothianidin - 30.7 g/L FS	metalaxyl - 9.24 g/L FS	metconazole - 4.62 g/L FS		*NipsIt Suite Cereals*	Valent Canada
clothianidin - 290 g/L FS	penflufen - 10.7 g/L FS	metalaxyl - 7.15 g/L FS	trifloxystrobin - 7.15 g/L FS	*Prosper EverGol*	Bayer CropScience
clothianidin - 600 g/L FS	penflufen - 100 g/L FS	prothioconazole - 18 g/L FS		*Titan Emesto*	Bayer CropScience
clothianidin - 600 g/L FS				*NipsIt Inside 600*	Valent Canada
clothianidin - 600 g/L FS				*Poncho 600FS*	Bayer CropScience
clothianidin - 600 g/L FS				*Titan 600FS*	Bayer CropScience
cyantraniliprole - 600 g/L FS				*Fortenza*	Syngenta Crop Protection
cytantraniliprole - 625 g/L FS				*Lumiderm*	E.I. duPont Canada
cytantraniliprole - 200 g/L FS				*Verimark*	E.I. duPont Canada

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
difenconazole - 112 g/L SC	azoxystrobin - 143 g/L SC	fludioxonil - 143 g/L SC		*Stadium*	Syngenta Crop Protection
difenconazole - 36.8 g/L FS	fludioxonil - 7.6 g/L FS	metalaxyl-m+s - 9.2 g/L FS	sedaxane - 15.4 g/L FS	*Vibrance Quattro*	Syngenta Crop Protection
difenconazole - 123 g/L FS	fludioxonil - 62.5 g/L FS	thiamethoxam - 250 g/L FS		*Cruiser Maxx Potato Extreme*	Syngenta Crop Protection
difenconazole - 19.4 g/L FS	fludioxonil - 19.4 g/L FS			*Maxim D*	Syngenta Crop Protection
difenconazole - 3.37 % FS	metalaxyl-m - 0.27% FS	sedaxane - 500 g/L FS		*Vibrance XL Co-Pack*	Syngenta Crop Protection
difenconazole - 66.2 g/L FS	metalaxyl-m+s - 16.5 g/L FS	sedaxane - 13.8 g/L FS		*Vibrance XL*	Syngenta Crop Protection
difenconazole:fludioxonil - 16:1.7 g/L FS	thiamethoxam - 269 g/L FS	sedaxane - 3.4 g/L FS	metalaxyl-m+s - 5 g/L FS	*Helix Vibrance*	Syngenta Crop Protection
difenoconazole - 123 g/L FS	thiamethoxam - 250 g/L FS	fludioxonil - 62.5 g/L FS		*Cruiser Maxx Vibrance Cereals*	Syngenta Crop Protection
difenoconazole - 36.9 g/L FS	thiamethoxam - 61.5 g/L FS	metalaxyl-m - 9.2 g/L FS	sedaxane - 15.4 g/L FS	*Cruiser Vibrance Quattro*	Syngenta Crop Protection
dimethyl benzyl ammonium chloride - 10% Liquid				*General Storage Disinfectant*	Ag-Services
ethaboxam - 383 g/L FS				*Intego Solo*	Valent Canada
fludioxonil - 143 g/L SC	difenconazole - 112 g/L SC	azoxystrobin - 143 g/L SC		*Stadium*	Syngenta Crop Protection
fludioxonil - 7.6 g/L FS	difenconazole - 36.8 g/L FS	metalaxyl-m+s - 9.2 g/L FS	sedaxane - 15.4 g/L FS	*Vibrance Quattro*	Syngenta Crop Protection
sedaxane - 3.4 g/L FS	difenconazole:fludioxonil - 16:1.7 g/L FS	thiamethoxam - 269 g/L FS	metalaxyl-m+s - 5 g/L FS	*Helix Vibrance*	Syngenta Crop Protection
fludioxonil - 19.4 g/L FS	difenconazole - 19.4 g/L FS			*Maxim D*	Syngenta Crop Protection
fludioxonil - 62.5 g/L FS	difenoconazole - 123 g/L FS	thiamethoxam - 250 g/L FS		*Cruiser Maxx Vibrance Cereals*	Syngenta Crop Protection
fludioxonil - 0.5% DS	mancozeb - 5.7% DS			*Maxim MZ PSP*	Syngenta Crop Protection
fludioxonil - 0.73% FS	metalaxyl-m - 1.10% FS	sedaxane - 500 g/L FS		*Vibrance Maxx RTA*	Syngenta Crop Protection
fludioxonil - 2.31% FS	metalaxyl-m+s - 3.46% FS	sedaxane - 500 g/L FS		*Vibrance Maxx RFC*	Syngenta Crop Protection
fludioxonil - 25 g/L FS	metalaxyl-m+s - 20 g/L FS	thiabendazole - 150 g/L FS		*Apron Advance*	Syngenta Crop Protection
fludioxonil - 0.73% FS	metalaxyl-m+s - 1.10% FS			*Apron Maxx RTA*	Syngenta Crop Protection
fludioxonil - 2.31% FS	metalaxyl-m+s - 3.46% FS			*Apron Maxx RFC*	Syngenta Crop Protection
fludioxonil - 1.12% FS	metalaxyl-m+s+r - 1.7% FS	thiamethoxam - 22.6% FS	sedaxane - 500 g/L FS	*Cruiser Maxx Vibrance Beans*	Syngenta Crop Protection
fludioxonil - 1.12% FS	metalaxyl-m+s+r - 1.7% FS	thiamethoxam - 22.6% FS		*Cruiser Maxx Beans (see Cruiser Maxx Vibrance Beans)*	Syngenta Crop Protection
fludioxonil - 3.32% FS	thiabendizole - 26.5% FS	metalaxyl-m+s - 2.65% FS	azoxystrobin - 1.33% FS	*Maxim Quattro*	Syngenta Crop Protection
fludioxonil - 62.5 g/L FS	thiamethoxam - 250 g/L FS	difenconazole - 123 g/L FS		*Cruiser Maxx Potato Extreme*	Syngenta Crop Protection
fludioxonil - 2.31% FS	thiamethoxam - 47.6% FS	metalaxyl-m+s - 3.46% FS		*Cruiser Maxx Pulses*	Syngenta Crop Protection
fludioxonil - 0.5% DS				*Maxim Maxim PSP*	Syngenta Crop Protection
fludioxonil - 40.3% LS				*Proseed*	Syngenta Crop Protection
hydrogen peroxide - 27% LS				*StorOx*	Biosafe Systems.
imidacloprid - 285 g/L FS	carbathiin - 47.6 g/L FS	thiram - 95.3 g/L FS		*Gaucho CS FL*	Bayer CropScience
imidacloprid - 600 g/L FS	metalaxyl - 6.2 g/L FS	prothioconazole - 15.4 g/L FS	tebuconazole - 3.0 g/L FS	*Raxil PRO Shield*	Bayer CropScience
imidacloprid - 600 g/L FS	metalaxyl - 6.6 g/L FS	tebuconazole - 5 g/L FS		*Raxil WW*	Bayer CropScience
imidacloprid - 240 g/L FS				*Admire SPT*	Bayer CropScience
imidacloprid - 240 g/L FS				*Alias 240SC*	ADAMA Canada
imidacloprid - 600 g/L FS				*Sombrero 600FS*	ADAMA Canada
imidacloprid - 600 g/L FS				*Stress Shield 600*	Bayer CropScience
ipconazole - 9.38 g/L FS	carbathiin - 87.5 g/L FS			*Rancona RS*	Platform Specialty Products
ipconazole - 4.61 g/L FS				*Rancona Apex*	Platform Specialty Products
mancozeb - 5.7% DS	fludioxonil - 0.5% DS			*Maxim MZ PSP*	Syngenta Crop Protection
mancozeb - 16% DS				*Solan MZ*	Norac Concepts
mancozeb - 16% DS				*Tuberseal*	Norac Concepts
mancozeb - 16% DS				*Potato ST16*	Wilbur-Ellis Co.
metalaxyl - 5.36 g/L FS	carbathiin - 50 g/L FS	clothianidin - 285.7 g/L FS	trifloxystrobin - 7.14 g/L FS	*Prosper FX*	Bayer CropScience
metalaxyl - 9.24 g/L FS	clothianidin - 30.7 g/L FS	metconazole - 4.62 g/L FS		*NipsIt Suite Cereals*	Valent Canada
metalaxyl - 6.2 g/L FS	imidacloprid - 600 g/L FS	prothioconazole - 15.4 g/L FS	tebuconazole - 3.0 g/L FS	*Raxil PRO Shield*	Bayer CropScience
metalaxyl - 6.6 g/L FS	imidacloprid - 600 g/L FS	tebuconazole - 5 g/L FS		*Raxil WW*	Bayer CropScience

(Component 1) Active Ingredient* - Formulation	(Component 2) Active Ingredient* - Formulation	(Component 3) Active Ingredient* - Formulation	(Component 4) Active Ingredient* - Formulation	Product	Company
metalaxyl - 7.15 g/L FS	penflufen - 10.7 g/L FS	clothianidin - 290 g/L FS	trifloxystrobin - 7.15 g/L FS	*Prosper EverGol*	Bayer CropScience
metalaxyl - 317 g/L FS	penflufin - 154 g/L FS	trifloxystrobin - 154 g/L FS		*Trilex EverGol*	Bayer CropScience
metalaxyl - 61.4 g/L FS	prothioconazole - 76.8 g/L FS	penflufen - 38.4 g/L FS		*EverGol Energy*	Bayer CropScience
metalaxyl - 6.2 g/L FS	prothioconazole - 15.4 g/L FS	tebuconazole - 3.0 g/L FS		*Raxil PRO*	Bayer CropScience
metalaxyl - 6.6 g/L FS	tebuconazole - 5 g/L FS			*Raxil MD*	Bayer CropScience
metalaxyl - 10.8 g/L FS	trifloxystrobin - 13.5 g/L FS			*Trilex AL*	Bayer CropScience
metalaxyl - 317 g/L FS				*Allegiance FL*	Bayer CropScience
metalaxyl - 317 g/L FS				*Belmont 2.7FS*	Platform Specialty Products
metalaxyl-m - 0.27% FS	difenconazole - 3.37 % FS	sedaxane - 500 g/L FS		*Vibrance XL Co-Pack*	Syngenta Crop Protection
metalaxyl-m - 9.2 g/L FS	difenoconazole - 36.9 g/L FS	thiamethoxam - 61.5 g/L FS	sedaxane - 15.4 g/L FS	*Cruiser Vibrance Quattro*	Syngenta Crop Protection
metalaxyl-m - 1.10% FS	fludioxonil - 0.73% FS	sedaxane - 500 g/L FS		*Vibrance Maxx RTA*	Syngenta Crop Protection
metalaxyl-m+s - 5 g/L FS	difenconazole:fludioxonil - 16:1.7 g/L FS	sedaxane - 3.4 g/L FS	thiamethoxam - 269 g/L FS	*Helix Vibrance*	Syngenta Crop Protection
metalaxyl-m+s - 16.5 g/L FS	difenconazole - 66.2 g/L FS	sedaxane - 13.8 g/L FS		*Vibrance XL*	Syngenta Crop Protection
metalaxyl-m+s - 9.2 g/L FS	fludioxonil - 7.6 g/L FS	difenconazole - 36.8 g/L FS	sedaxane - 15.4 g/L FS	*Vibrance Quattro*	Syngenta Crop Protection
metalaxyl-m+s - 3.46% FS	fludioxonil - 2.31% FS	sedaxane - 500 g/L FS		*Vibrance Maxx RFC*	Syngenta Crop Protection
metalaxyl-m+s - 20 g/L FS	fludioxonil - 25 g/L FS	thiabendazole - 150 g/L FS		*Apron Advance*	Syngenta Crop Protection
metalaxyl-m+s - 2.65% FS	fludioxonil - 3.32% FS	thiabendizole - 26.5% FS	azoxystrobin - 1.33% FS	*Maxim Quattro*	Syngenta Crop Protection
metalaxyl-m+s - 3.46% FS	fludioxonil - 2.31% FS	thiamethoxam - 47.6% FS		*Cruiser Maxx Pulses*	Syngenta Crop Protection
metalaxyl-m+s - 1.10% FS	fludioxonil - 0.73% FS			*Apron Maxx RTA*	Syngenta Crop Protection
metalaxyl-m+s - 3.46% FS	fludioxonil - 2.31% FS			*Apron Maxx RFC*	Syngenta Crop Protection
metalaxyl-m+s+r - 1.7% FS	thiamethoxam - 22.6% FS	fludioxonil - 1.12% FS	sedaxane - 500 g/L FS	*Cruiser Maxx Vibrance Beans*	Syngenta Crop Protection
metalaxyl-m+s+r - 1.7% FS	thiamethoxam - 22.6% FS	fludioxonil - 1.12% FS		*Cruiser Maxx Beans (see Cruiser Maxx Vibrance Beans)*	Syngenta Crop Protection
metalaxyl-r+s - 10 g/L FS	pyraclostrobin - 17 g/L FS	triticonazole - 17 g/L FS		*Insure Cereal*	BASF Canada
metconazole - 4.62 g/L FS	metalaxyl - 9.24 g/L FS	clothianidin - 30.7 g/L FS		*NipsIt Suite Cereals*	Valent Canada
mono/di-potassium salts of phosphorous acid - 53% SN				*Rampart*	Loveland Products Canada
mono/di-potassium salts of phosphorous acid - 45.8% SC				*Confine*	Winfield Solutions
mono/di-potassium salts of phosphorous acid - 53% SC				*Confine Extra*	Winfield Solutions
mono/di-potassium salts of phosphorous acid - 53% SC				*Rampart*	Loveland Products Canada
penflufen - 10.7 g/L FS	clothianidin - 290 g/L FS	metalaxyl - 7.15 g/L FS	trifloxystrobin - 7.15 g/L FS	*Prosper EverGol*	Bayer CropScience
penflufen - 100 g/L FS	clothianidin - 600 g/L FS	prothioconazole - 18 g/L FS		*Titan Emesto*	Bayer CropScience
penflufen - 38.4 g/L FS	prothioconazole - 76.8 g/L FS	metalaxyl - 61.4 g/L FS		*EverGol Energy*	Bayer CropScience
penflufen - 100 g/L FS	prothioconazole - 18 g/L FS			*Emesto Silver*	Bayer CropScience
penflufin - 154 g/L FS	metalaxyl - 317 g/L FS	trifloxystrobin - 154 g/L FS		*Trilex EverGol*	Bayer CropScience
prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS	imidacloprid - 600 g/L FS	tebuconazole - 3.0 g/L FS	*Raxil PRO Shield*	Bayer CropScience
prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS	tebuconazole - 3.0 g/L FS		*Raxil PRO*	Bayer CropScience
prothioconazole - 18 g/L FS	penflufen - 100 g/L FS	clothianidin - 600 g/L FS		*Titan Emesto*	Bayer CropScience
prothioconazole - 76.8 g/L FS	penflufen - 38.4 g/L FS	metalaxyl - 61.4 g/L FS		*EverGol Energy*	Bayer CropScience
prothioconazole - 18 g/L FS	penflufen - 100 g/L FS			*Emesto Silver*	Bayer CropScience
pyraclostrobin - 17 g/L FS	metalaxyl-r+s - 10 g/L FS	triticonazole - 17 g/L FS		*Insure Cereal*	BASF Canada
Saponins of Chenopodium quinoa - 63.02% WS				*Heads Up Plant Protectant*	Heads Up Plant Protectants
sedaxane - 3.4 g/L FS	difenconazole:fludioxonil - 16:1.7 g/L FS	thiamethoxam - 269 g/L FS	metalaxyl-m+s - 5 g/L FS	*Helix Vibrance*	Syngenta Crop Protection
sedaxane - 15.4 g/L FS	difenoconazole - 36.9 g/L FS	metalaxyl-m - 9.2 g/L FS	thiamethoxam - 61.5 g/L FS	*Cruiser Vibrance Quattro*	Syngenta Crop Protection
sedaxane - 15.4 g/L FS	fludioxonil - 7.6 g/L FS	metalaxyl-m+s - 9.2 g/L FS	difenconazole - 36.8 g/L FS	*Vibrance Quattro*	Syngenta Crop Protection
sedaxane - 500 g/L FS	metalaxyl-m - 0.27% FS	difenconazole - 3.37 % FS		*Vibrance XL Co-Pack*	Syngenta Crop Protection
sedaxane - 500 g/L FS	metalaxyl-m - 1.10% FS	fludioxonil - 0.73% FS		*Vibrance Maxx RTA*	Syngenta Crop Protection
sedaxane - 13.8 g/L FS	metalaxyl-m+s - 16.5 g/L FS	difenconazole - 66.2 g/L FS		*Vibrance XL*	Syngenta Crop Protection
sedaxane - 500 g/L FS	metalaxyl-m+s - 3.46% FS	fludioxonil - 2.31% FS		*Vibrance Maxx RFC*	Syngenta Crop Protection

(Component 1) Active Ingredient[a] - Formulation	(Component 2) Active Ingredient[a] - Formulation	(Component 3) Active Ingredient[a] - Formulation	(Component 4) Active Ingredient[a] - Formulation	Product	Company
sedaxane - 500 g/L FS	metalaxyl-m+s+r - 1.7% FS	fludioxonil - 1.12% FS	thiamethoxam - 22.6% FS	*Cruiser Maxx Vibrance Beans*	Syngenta Crop Protection
sedaxane - 500 g/L FS				*Vibrance 500FS*	Syngenta Crop Protection
tebuconazole - 5 g/L FS	metalaxyl - 6.6 g/L FS	imidacloprid - 600 g/L FS		*Raxil WW*	Bayer CropScience
tebuconazole - 3.0 g/L FS	metalaxyl - 6.2 g/L FS	prothioconazole - 15.4 g/L FS	imidacloprid - 600 g/L FS	*Raxil PRO Shield*	Bayer CropScience
tebuconazole - 5 g/L FS	metalaxyl - 6.6 g/L FS			*Raxil MD*	Bayer CropScience
tebuconazole - 3.0 g/L FS	prothioconazole - 15.4 g/L FS	metalaxyl - 6.2 g/L FS		*Raxil PRO*	Bayer CropScience
thiabendazole - 58 g/L LS	carbathiin - 92 g/L LS			*Crown*	Platform Specialty Products
thiabendazole - 150 g/L FS	metalaxyl-m+s - 20 g/L FS	fludioxonil - 25 g/L FS		*Apron Advance*	Syngenta Crop Protection
thiabendizole - 26.5% FS	fludioxonil - 3.32% FS	metalaxyl-m+s - 2.65% FS	azoxystrobin - 1.33% FS	*Maxim Quattro*	Syngenta Crop Protection
thiabendizole - 500 g/L SC				*Mertect SC*	Syngenta Crop Protection
thiamethoxam - 269 g/L FS	difenconazole:fludioxonil - 16:1.7 g/L FS	sedaxane - 3.4 g/L FS	metalaxyl-m+s - 5 g/L FS	*Helix Vibrance*	Syngenta Crop Protection
thiamethoxam - 250 g/L FS	difenoconazole - 123 g/L FS	fludioxonil - 62.5 g/L FS		*Cruiser Maxx Vibrance Cereals*	Syngenta Crop Protection
thiamethoxam - 61.5 g/L FS	difenoconazole - 36.9 g/L FS	metalaxyl-m - 9.2 g/L FS	sedaxane - 15.4 g/L FS	*Cruiser Vibrance Quattro*	Syngenta Crop Protection
thiamethoxam - 250 g/L FS	fludioxonil - 62.5 g/L FS	difenconazole - 123 g/L FS		*Cruiser Maxx Potato Extreme*	Syngenta Crop Protection
thiamethoxam - 47.6% FS	fludioxonil - 2.31% FS	metalaxyl-m+s - 3.46% FS		*Cruiser Maxx Pulses*	Syngenta Crop Protection
thiamethoxam - 22.6% FS	metalaxyl-m+s+r - 1.7% FS	fludioxonil - 1.12% FS	sedaxane - 500 g/L FS	*Cruiser Maxx Vibrance Beans*	Syngenta Crop Protection
thiamethoxam - 22.6% FS	metalaxyl-m+s+r - 1.7% FS	fludioxonil - 1.12% FS		*Cruiser Maxx Beans (see Cruiser Maxx Vibrance Beans)*	Syngenta Crop Protection
thiamethoxam - 47.6% FS				*Cruiser 5FS*	Syngenta Crop Protection
thiamethoxam - 240 g/L FS				*Actara 240SC (Cruiser Maxx Potato Extreme)*	Syngenta Crop Protection
thiophanate-methyl - 10% DS				*Senator PSPT*	UAP
thiram - 95.3 g/L FS	carbathiin - 47.6 g/L FS	imidacloprid - 285 g/L FS		*Gaucho CS FL*	Bayer CropScience
thiram - 13.25% FS	carbathiin - 15.59% FS			*Vitaflo 280*	Platform Specialty Products
thiram - 13.25% FS	carbathiin - 15.59% FS			*Vitaflo SP Fungicide*	IPCO
thiram - 13.25% FS	carbathiin - 15.59% FS			*Vitaflo Fungicide*	IPCO
thiram - 12.5% FS	tritconazole - 1.25% FS			*Gemini*	BASF Canada
thiram - 75% WP				*Thiram 75WP*	Platform Specialty Products
trifloxystrobin - 7.14 g/L FS	carbathiin - 50 g/L FS	metalaxyl - 5.36 g/L FS	clothianidin - 285.7 g/L FS	*Prosper FX*	Bayer CropScience
trifloxystrobin - 13.5 g/L FS	metalaxyl - 10.8 g/L FS			*Trilex AL*	Bayer CropScience
trifloxystrobin - 7.15 g/L FS	penflufen - 10.7 g/L FS	metalaxyl - 7.15 g/L FS	clothianidin - 290 g/L FS	*Prosper EverGol*	Bayer CropScience
trifloxystrobin - 154 g/L FS	penflufin - 154 g/L FS	metalaxyl - 317 g/L FS		*Trilex EverGol*	Bayer CropScience
tritconazole - 1.25% FS	thiram - 12.5% FS			*Gemini*	BASF Canada
tritconazole - 16.8 g/L FS				*Charter RTU*	BASF Canada
tritconazole - 25 g/L FS				*Armour*	BASF Canada
tritconazole - 16.8 g/L FS				*Armour RTU*	BASF Canada
triticonazole - 17 g/L FS	pyraclostrobin - 17 g/L FS	metalaxyl-r+s - 10 g/L FS		*Insure Cereal*	BASF Canada

Insecticides

Product	***Active ingredient***	***Formulation***	***Company***
Actara 240 SC/Actara 25 WG	thiamethoxam	240 g/L SC, 25% WG	Syngenta Canada
Admire 240 / SPT	imidacloprid	240 g/L SC	Bayer CropScience
Alias 240 SC	imidacloprid	240 g/L SC	Loveland Products Canada
Ambush	permethrin	500 g/L EC	Amvac Chemical Corp.
Assail	acetamiprid	70% WP	Engage Agro / Nippon Soda Co. Ltd
Beleaf	flonicamid	50% WG	FMC of Canada
Capture	bifenthrin	240 g/L	FMC of Canada
Citadel 480EC	chlorpyrifos	480 g/L EC	IPCO
Closer	sulfoxaflor	240 g/L	Dow AgroSciences
Clutch	clothianidin	50% WG	Valent Canada Inc.
Concept	imidacloprid : deltamethrin	75 g/L SC : 10 g/L SC	Bayer CropScience
Coragen	chlorantraniliprole	200 g/L SC	E. I. duPont Canada
Cygon 480EC / Cygon 480-Ag	dimethoate	480 g/L EC	IPCO, Cheminova Canada
Decis	deltamethrin	50 g/L EC	Bayer CropScience
Delegate	spinetoram	25% SG	Dow AgroSciences
Dibrom	naled	864 g/L EC	Loveland Products Canada
Dipel 2X DF	*Bacillus thuringiensis*	32 billion CLU/kg WG	Valent BioSciences
Eco Bran	carbaryl	2% spreadable bran bait	Peacock Industries
Entrust	spinosad	80% WP	Dow AgroSciences
Fulfill	pymetrozine	50% WG	Syngenta Canada
Grapple / Grapple$_2$	imidacloprid	240 g/L SC	Cheminova Canada
Imidan	phosmet	50% WP	Loveland Products Canada
Insecto	diatomaceous earth	90%	Natural Insecto Products Inc.
Lagon 480E	dimethoate	480 g/L EC	Loveland Products Canada
Lannate	methomyl	90% SP	E. I. duPont Canada
Lorsban 4E	chlorpyrifos	480 g/L EC	Dow AgroSciences
Mako	cypermethrin	407 g/L EC	Engage Agro Corp.
Malathion 85E / 500	malathion	85%, 500 g/L EC	Loveland Products Canada, IPCO
Matador	lambda-cyhalothrin	120 g/L EC	Syngenta Canada
Minecto Duo	thiamethoxam : cyantraniliprole	20% : 20% WG	Syngenta Canada
Movento 240 SC	spirotetramat	240 g/L SC	Bayer CropScience
MPOWER Krypton	chlorpyrifos	480 g/L	NewAgco Inc.
Nolo Bait	spores of *Nosema (Paranosema) locustae Canning*	Minimum of $2.2\text{x}10^{9}$ on coated wheat bran	M&R Durango, Inc.
Nufos 4E	chlorpyrifos	480 g/L EC	Cheminova Canada
Oberon	spiromesifen	240 g/L SC	Bayer CropScience
Orthene	acephate	75% SP	Loveland Products Canada
Perm-UP	permethrin	384 g/L EC	United Phosphorous Inc
Phostoxin	aluminum phosphide	55% tablets	Degesch America Inc
Pounce	permethrin	384 g/L EC	FMC of Canada
Protect-It	diatomaceous earth	90%	Hedley Technologies Ltd
Pyrifos 15G	chlorpyrifos	15% G	Loveland Products Canada
Pyrinex 480EC	chlorpyrifos	480 g/L EC	ADAMA Canada
Rimon 10 EC	novaluron	10% EC	MacDermid Agricultural Solutions, , ADAMA Canada
Sevin XLR PLUS	carbaryl	480 g/L SC	Bayer CropScience
Silencer 120 EC	lambda-cyhalothrin	120 g/L EC	ADAMA Canada
Sluggo Professional	ferric phosphate	0.76 % granules	Engage Agro Corp.
Success 480 SC	spinosad	480 g/L SC	Dow AgroSciences
Superior 70 oil	mineral oil	99%	Loveland Products Canada, N.M. Bartlett Inc.
Tempo	cyfluthrin	20% WP	Bayer CropScience
Thimet 20G	phorate	20% G	Amvac Chemical
Thionex EC	endosulfan	400 g/L EC	Loveland Products Canada
UP-Cyde	cypermethrin	250 g/L EC	United Phosphorous Inc
Voliam Xpress	lambda-cyhalothrin: chlorantraniliprole	50 g/L: 100 g/L	Syngenta Canada
Warhawk	chlorpyrifos	480 g/L EC	Loveland Products Canada

KEY TO PRODUCT PAGES

Pesticide Product Name

This field lists the pesticide product name. Where there is only one product the commercial "trade" name is given. Where more than one company sells pesticides with the same combination of active ingredients the "generic" (active ingredient) name is given.

If the active ingredients are all in a common formulation (liquid, granule, etc.) the generic name will appear as '*Ingredient A/Ingredient B*' and if the active ingredients are in separate containers to be mixed in the sprayer the names are given as '*Ingredient A + Ingredient B*'.

Pesticide Resistance Group – #

This area will the pesticide active ingredient(s) to the mode of action that ingredient uses and refer to a page number where more information can be found.

Company:

This section identifies the company (or companies) that manufacture or market this crop protection product (or generic equivalents) in Canada as well as the PCP# for that (those) product(s). See page 9 for more information on PCP numbers. PCP#s are given as '*(PCP#XXXXX)*' where XXXXX is a four or five digit number unique to that product. In some cases, where there are multiple components with separate PCP numbers, the PCP number will be provided below under 'Formulation:'

Formulation:

This section gives information on the active ingredient and its concentration in the product as well as information on formulation type and packaging types and configurations. Formulation strength (or concentrations) are given in % by weight for dry formulations and g/L for liquid formulations. PCP numbers may also be give for some products (see above).

Crops and Staging:*

This section indicates on which crops the product may be used and what stage of crop development it should be applied at. Rates may also be included in this section if they vary between crop types or crop stage.

**This section will also indicate which crops are registered under the User Requested Minor Use Label Expansion (URMULE) program. Some companies, as a condition of placing these minor crops on their labels request, that users of their product on these crops do so at their own risk because the registration was approved with information the company did not produce.*

These crops will be flagged separately from the main crops.

Pest (Diseases, Insects, Weeds) and Staging:

This section indicates the pests (Diseases, Insects, or Weeds) that are indicated on the product label as controlled or suppressed, as well as any specifics on the timing of application relative to the pest stage if required. Rates may also be included in this section if they differ for different pests or stage of pest.

Rates:

The rates provided in this section are given in the amount of product required per acre and the number of acres treated per package unit where possible. This section will also indicate any adjuvants that are to be used in conjunction with the product and the rate of that adjuvant.

This section will not be present if rates have been integrated into either of the previous **Crops** or **Pest** sections.

Application Information:

Water Volume: This section indicates the minimum carrier water volume to be used to apply the product. Using less than the recommended minimum carrier application volume can negatively affect pesticide performance, particularly with contact pesticides and when using low drift nozzles.

Nozzles and Pressure: This section indicates if there are any particular nozzles that should or should not be used to apply the product. Pressures indicated reflect those for conventional nozzles. Low drift nozzles may require higher pressures for proper performance. A general statement of "Use nozzles and pressures designed to deliver proper coverage with *ASABE* ____ droplets" indicating the ideal droplet sizes to allow for the combination of lowest drift potential and best performance from the pesticide. ASABE refers to the American Society of Agricultural Engineers who have set standards a series of droplet measurements (in microns or micrometres) that classify droplet sizes from *'fine'* to *'very coarse'*.

How it Works:

This section typically refers to the page where a general description of the various modes of action of either herbicide, fungicides or insecticides.

Effects of Growing Conditions:

This section summarizes any adverse conditions that will affect the biological function of the crop or the target pest and therefore possibly impact the product's performance. In most cases both crop and target pest must be growing or functioning normally for pesticides to provide expected performance and / or crop tolerance. Adverse weather conditions such as extreme heat, cold, drought or flooding can slow or stop the biological processes in the crop or pest. These biological processes in the crop allow the pesticide to be degraded quickly. If biological processes that are attacked by the pesticide, and under normal conditions would kill the pest, are not functioning normally the pest may be able to rid itself of the pesticide before dying and recover from the application.

Tank Mixes:

This section indicates which other pesticides the pesticide label indicates are registered for use as tank mix combinations with this pesticide.
Common mixes may include:
Herbicides:
(Subtitles may indicate specific crops or condition restrictions:)
Insecticides:

Fungicides:

Fertilizers:

There may be additional pesticides that are registered but not listed on this product's label. Other pesticides may have this product listed as a mix option on their labels. The note below **(in bold)** directs users to a chart inside the back cover that show all available mixes for this pesticide. The product listed on the left column of the chart is the product that supports the mix. Mixes supported by both products are marked with an 'X'. Mixes supported by only one of the products is indicated by an arrow pointing to the left column.
Included in the tank mix section in non-bolded italics may be any precautions against the mixing of pesticides which will have adverse reactions such as crop injury, reduced pest control or unusual increased danger in the use of the product.
Note: The above mixes are those listed on the pesticide label only. To check for other possible mixes see the blue fold out chart inside the back cover.

Restrictions:

Since most pesticides have a capacity to injure neighboring plants, wildlife or people, they will come with restrictions on their use in order to prevent this unintentional damage. Misuse of pesticides may result in as little as temporary or superficial damage to plants or a slight irritation to the eyes or nose, or could also result in poor performance of the pesticide, severe injury and / or yield loss to very sensitive plants and / or unacceptable residues in agricultural commodities, and / or serious illness or death of non-target organism or people. It is important to comply with product restrictions in order to minimize the impact of the pesticide used on non-target organisms and people. A selection of common restrictions and precautions found on product labels are provided in this section, ***but it is important to read the label carefully in order to understand how to use the product properly.***

Rainfall: This section indicates the required delay between application and rainfall to avoid reductions in the performance of the product or the unintentional movement of the product.

Re-entry: This section indicates when it is safe for a person to re-enter treated field following an application of a particular pesticide without the same personal protection used to apply the product.

Resistance Management: This section highlights products where an increased risk of the target pests developing resistance to the group of products (typically fungicides) has been identified. If no specific risk has been identified the reader is referred to a general resistance section. All pesticides have some risk of the target pest developing resistance. Rotating pesticide groups using as many different resistance groups as possible in the rotation is one way to avoid or delay resistance development.

Grazing: This section indicates whether and how soon treated crops may be grazed by livestock or otherwise fed to livestock. This restriction is in place to avoid residues of the pesticide from being detected in milk or meat from animals consuming forage, greenfeed or straw from treated crops or forage.

Pre-harvest interval: Is the time that must be left between application of a pesticide and the harvest of a crop in order to prevent greater than allowable residues of the pesticide in the harvested material. Harvest is the cutting of the crop (i.e. combining or hay cut) or removal of the harvestable material from the plant (i.e. picking fruit or striper header). Maximum Residue Limits (MRLs) are set for commodities based on registered rates and staging of pesticides used in the production of those commodities. Disregarding these intervals can result in residues over the MRLs, which can lead to market disruptions.

Re-cropping: This section indicates how soon specific crops may be seeded into treated fields. Failure to adhere to these delays could result in injury to the following crop.

Aerial Application: This section indicates whether the product may be applied by aircraft and any special conditions that may be necessary.

Labelling: In addition to other precautions and warnings, seed treatment products will also have statements about how seed treated with the product should be labeled.

Storage: This section indicates how the product must be stored. As a general rule, unused pesticides should always be stored in their original containers in a secure, dry area, away from other pesticides, food or feed.

Buffer Zones: This section will indicate any setback distances that are required from sensitive aquatic or upland habitats. Newer labels may indicate that these distances are from the downwind edge of the boom but older labels may not. Examples of aquatic habitats are lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands. Examples of terrestrial habitats are grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands.

In addition to the set back or 'buffer' distances indicated on product labels, provincial environment departments may also have additional restrictions or requirements for permits to apply pesticides to or near water. Check with the provincial environment department/ministry for more information.

Tank Cleaning:

This section describes the measures that are required to properly clean out spray tanks. A general overview of sprayer cleaning is given on page 14, but products where there is a high risk of crop damage as a result of very low level contamination of the spray solution, will have specific measures indicated.

Hazard Rating:

This section indicates the relative toxicity of the pesticide, formulations or components. For an explanation of the symbols used here see page 10. An additional symbol that is used that is not a standard symbol is the (!) exclamation mark which indicates an otherwise undefined risk factor (i.e. irritation).

Example:

▽ Caution – Eye Irritant

Some older products have not had hazard ratings developed while others products have very low toxicity and do not have hazard warnings. Even in the absence of a hazard rating users should wear a minimum of nitrile gloves and an apron as well as long sleeved apparel during mixing and avoid unnecessary exposure.

Weed Control

The use of in crop herbicides to control weeds is often very important in determining the success or failure of a crop. However, many other practices that can be implemented before and after a herbicide application can help to reduce weed competition. The use of these practices is termed Integrated Weed Management.

Integrated Weed Management

A farming system that utilizes an array of inter-dependent cultural, biological and herbicidal weed control practices is implementing Integrated Weed Management (IWM). It is essential that IWM involves an array of tools including the rotation of available herbicide groups, ensuring that weeds are exposed to a diverse range of control mechanisms. The principal aim of IWM is to improve the health and vigour of crops so that they may out-compete weeds emerging in the stand. This helps to reduce selection for resistance to any single control agent and to delay or prevent the development of herbicide resistant weeds.

Practising IWM does not mean abandoning chemical weed control, just relying on it less exclusively. For example:

- You may decide to choose a taller wheat variety or a tall, viny pea variety for a certain field. These crop selections will compete strongly with weeds, possibly allowing you to skip a spray operation in more competitive crops.
- You could insert a short-term forage crop into your crop rotation. Studies show that short-term alfalfa stands can reduce wild oat and green foxtail populations by up to 80 percent the year after breaking.
- Early sown barley may give you enough of a "jump" on the weeds that you can avoid herbicide applications.
- Use of vigorous, high-quality seed, sown shallow, can give you better crop competition than poor-quality or deeply sown crop seed.
- Banding nitrogen near the seed can give your crop an advantage over weeds.

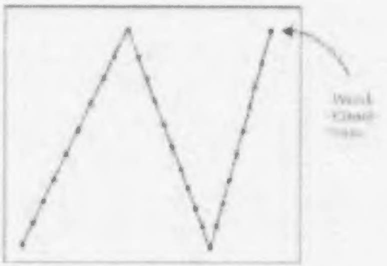
For more information, refer to "Integrated Weed Management: Making it Work on Your Farm" factsheet, available from both Manitoba Agriculture, Food and Rural Development and Saskatchewan Ministry of Agriculture.

Making Spray Decisions

Field Scouting

Field scouting is an important tool for making informed spray decisions. Accurately assessing the type and number of weeds in the field will help you determine if a spray operation is necessary. The scouting pattern diagram on this page provides a guideline for scouting a field. The entire field should be walked to get a feel for the distribution and species of the weeds present. A minimum of 20 weed counts should be taken across the field. A smaller number may be used, but be aware that accuracy decreases as the number of counts gets smaller. Count the number of weeds in a 1 m^2 or a 0.25 m^2 area and divide the total number of weeds by the number of counts taken to obtain an average for the field. If using 0.25 m^2 samples, make sure to multiply by four so your average is for a 1 m^2 area.

Some weeds are not distributed uniformly and may be found in patches (for example, Canada thistle) or in low spots. As well, the type and number of weeds found along the field edges may be very different from those found inside the field. These areas should be considered separate from the rest of the field. If possible, patches, low spots, and field borders should be treated separately, as field wide spraying may not be required. Look out for new invading weeds and patches of herbicide-resistant weeds. Herbicide-resistant weeds and new invaders should be removed (manually if necessary), regardless of their number, to prevent them from spreading and becoming a serious control problem. Mapping your field's weed problems will allow you to monitor the spread of weed patches over time and help you assess the effectiveness of your control program.



Yield Losses Caused by Weeds

Knowing the amount of crop yield loss caused by a given weed density will help you decide if a spray operation is required. The tables on the following pages give an indication of the yield loss caused by some of the important grassy weeds.

THESE TABLES SHOULD BE USED ONLY AS A GUIDE. The figures are based on Western Canadian research trials and will not be accurate all of the time. The yield loss values apply only to healthy, well fertilized crops with good stand establishment. Crops that are diseased or emerged unevenly will not compete well with weeds and will suffer larger yield losses than indicated in these tables. The yield loss figures are based on competition from single weed species only. Other weeds, such as wild mustard or Canada thistle, must be controlled if the figures are to be accurate. As well, the tables are based on competition from normal height crops. Semi-dwarf or hybrid varieties may not compete as well with weeds and the figures may not be accurate in these cases.

Table 1. Yield Losses (Percent) in Wheat Caused by Wild Oats.

	Wild Oat Density - Number Per Square Metre																
	1	2	4	6	8	10	12	14	16	18	20	25	30	35	40	45	50
Wild Oats are 1 Leaf Stage Ahead of the Crop	1	2	4	6	8	10	12	14	15	17	19	22	26	29	32	34	37
Wild Oats are the Same Leaf Stage as the Crop	1	1	2	4	5	6	7	8	9	10	11	14	16	18	20	22	24
Wild Oats are 1 Leaf Stage Behind the Crop	0	1	1	2	3	3	4	5	5	6	7	8	10	11	13	14	15

Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Figure 1. Spray Decision Guideline for Wild Oats in Wheat.

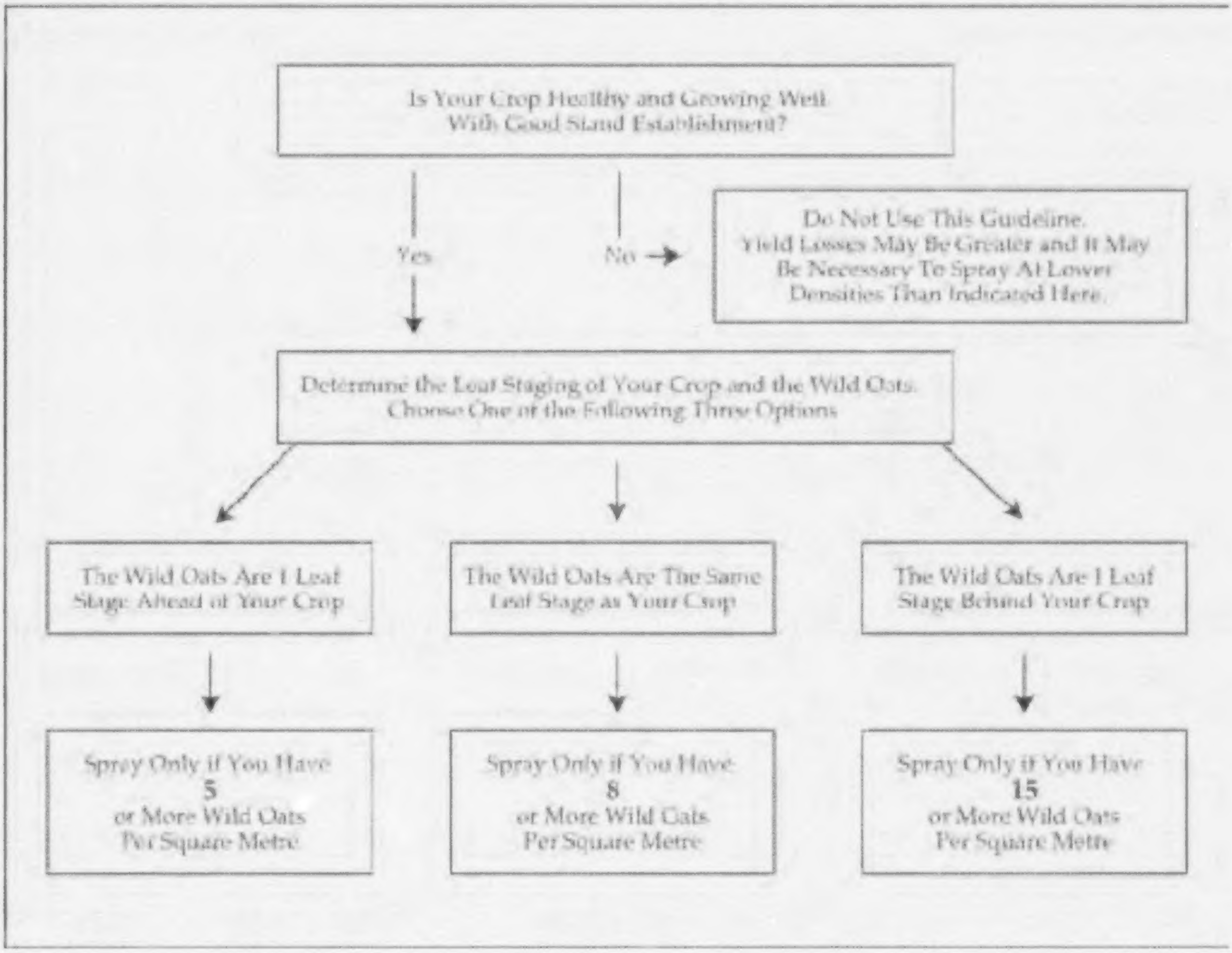
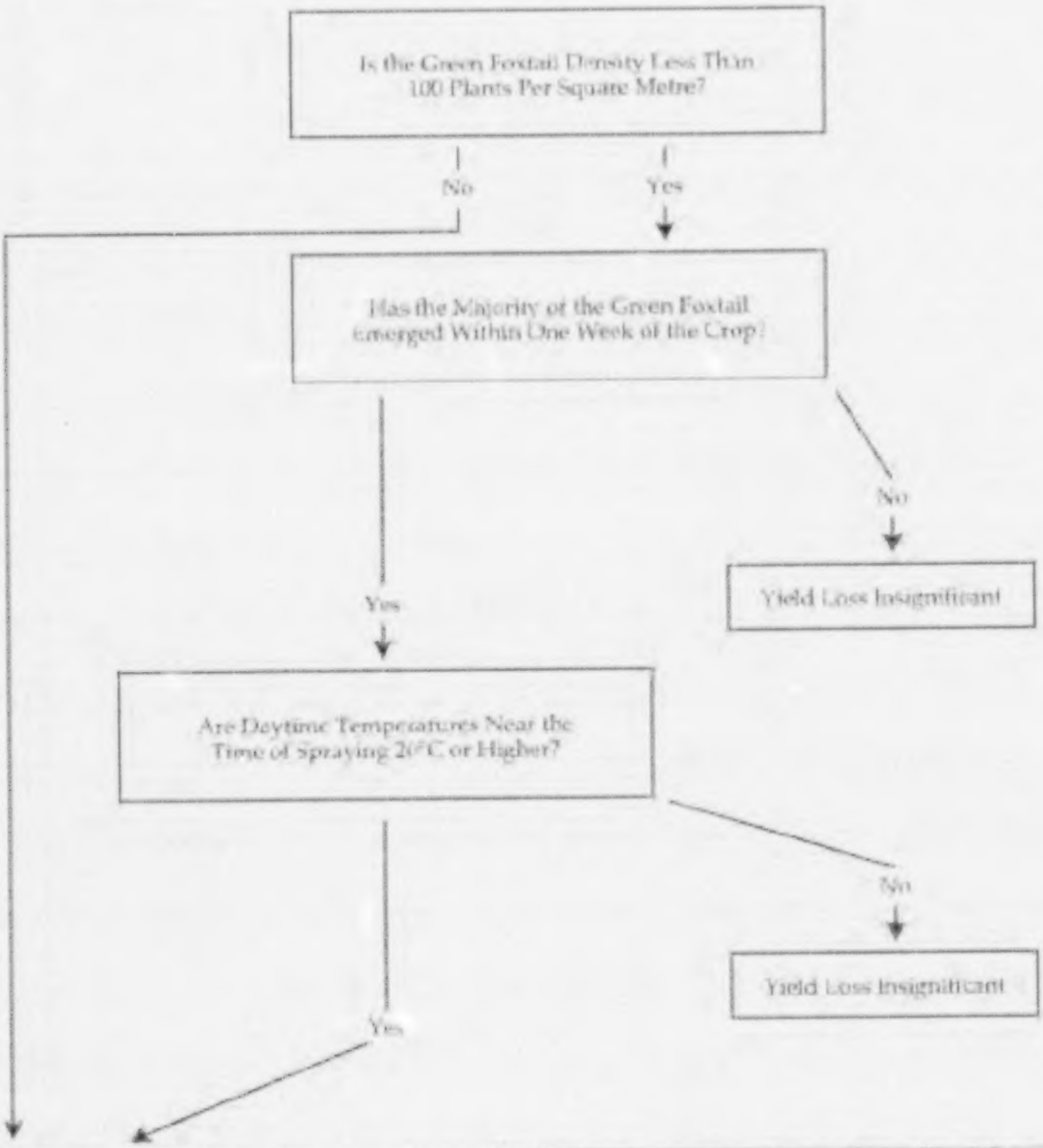

Is Your Crop Healthy and Growing Well With Good Stand Establishment?
Yes
No
Do Not Use This Guideline. Yield Losses May Be Greater and It May Be Necessary To Spray At Lower Densities Than Indicated Here.
Determine the Leaf Staging of Your Crop and the Wild Oats. Choose One of the Following Three Options
The Wild Oats Are 1 Leaf Stage Ahead of Your Crop
The Wild Oats Are The Same Leaf Stage as Your Crop
The Wild Oats Are 1 Leaf Stage Behind Your Crop
Spray Only if You Have 5 or More Wild Oats Per Square Metre
Spray Only if You Have 8 or More Wild Oats Per Square Metre
Spray Only if You Have 15 or More Wild Oats Per Square Metre

Table 2. Yield Losses (Percent) in Wheat Caused by Green Foxtail (Wild Millet).


Is the Green Foxtail Density Less Than 100 Plants Per Square Metre?
No
Yes
Has the Majority of the Green Foxtail Emerged Within One Week of the Crop?
No
Yield Loss Insignificant
Yes
Are Daytime Temperatures Near the Time of Spraying 20°C or Higher?
No
Yield Loss Insignificant
Yes

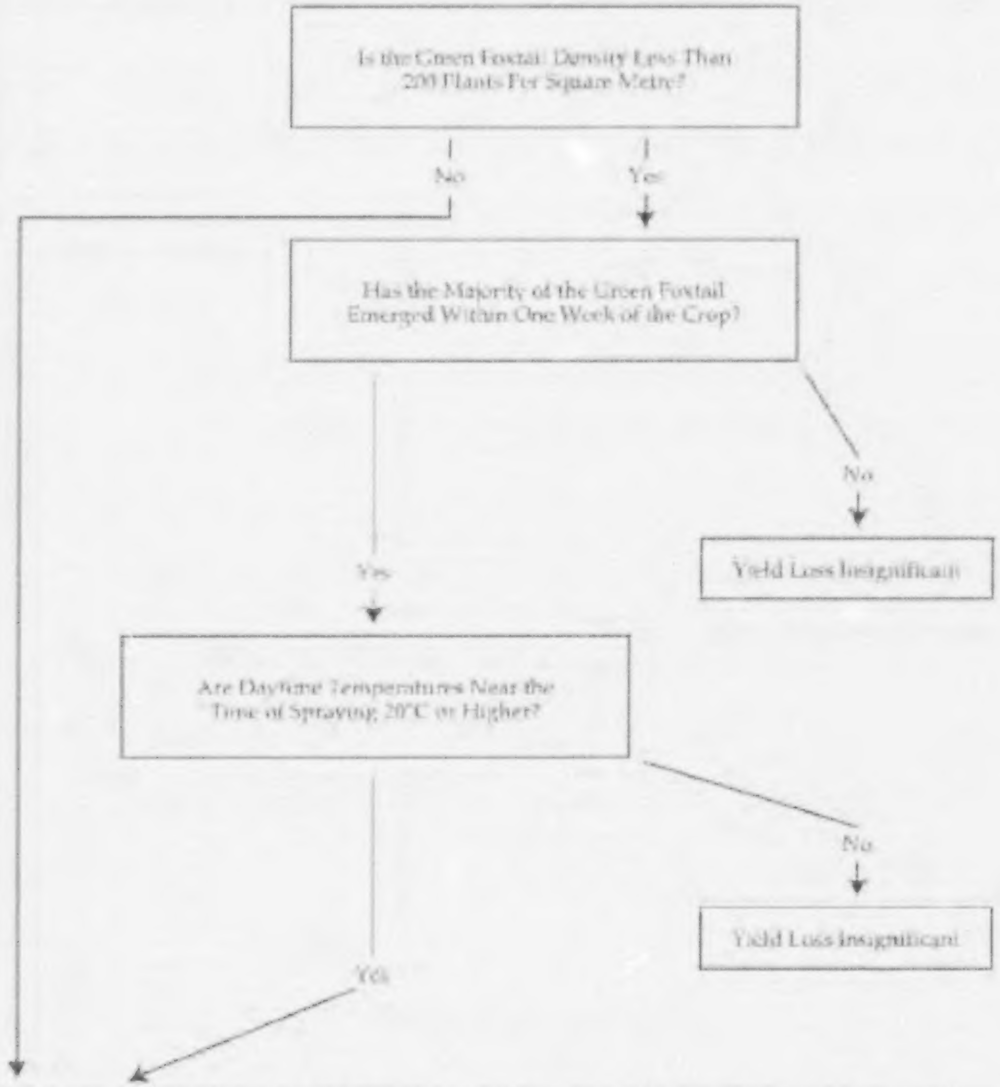
Green Foxtail Density (no. per square metre)	50	75	100	125	150	175	200	250	300	350	400	450	500
Yield Loss (percent)	2	3	5	6	7	8	9	11	14	16	18	20	23

Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 3. Yield Losses (Percent) in Barley Caused by Wild Oats.

Crop Density (plants/m²)	Relative Emergence	Wild Oat Density (plants/m²)											
		1	5	10	15	20	25	30	40	50	70	100	150
300	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.3	1.4	2.8	4.1	5.4	6.7	8.0	10.3	12.6	16.8	22.4	30.2
	Wild Oats are the Same Leaf Stage as the Crop	0.3	1.3	2.5	3.7	4.8	6.0	7.1	9.2	11.3	15.1	20.3	27.6
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	0.9	1.7	2.6	3.4	4.2	5.0	6.6	8.1	11.0	15.0	20.9
225	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.4	1.9	3.6	5.4	7.0	8.6	10.2	13.1	15.9	20.9	27.4	36.2
	Wild Oats are the Same Leaf Stage as the Crop	0.3	1.6	3.1	4.6	6.1	7.5	8.8	11.4	13.9	18.4	24.4	32.6
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	1.0	2.0	3.0	4.0	4.9	5.8	7.6	9.3	12.6	17.1	23.6
175	Wild Oats are 1 Leaf Stage Ahead of the Crop	0.5	2.3	4.6	6.7	8.7	10.7	12.5	16.1	19.3	25.1	32.3	41.8
	Wild Oats are the Same Leaf Stage as the Crop	0.4	1.9	3.8	5.6	7.3	8.9	10.5	13.6	16.4	21.6	28.2	37.1
	Wild Oats are 1 Leaf Stage Behind the Crop	0.2	1.1	2.3	3.4	4.4	5.5	6.5	8.5	10.4	14.0	18.9	25.9

Table 4. Yield Losses (Percent) in Barley Caused by Green Foxtail (Wild Millet).


Is the Green Foxtail Density Less Than 200 Plants Per Square Metre?
No
Yes
Has the Majority of the Green Foxtail Emerged Within One Week of the Crop?
No
Yield Loss Insignificant
Yes
Are Daytime Temperatures Near the Time of Spraying 20°C or Higher?
No
Yield Loss Insignificant
Yes

Green Foxtail Density (no. per square metre)	50	75	100	125	150	175	200	250	300	350	400	450	500
Yield Loss (percent)	1	2	3	3	4	5	6	7	8	10	11	13	14

Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 5. Yield Losses (Percent) in Canola Caused by Wild Oats and Volunteer Cereals.

	Weed Density – Number Per Square Metre												
	1	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**25**	**30**
Wild Oats	3	5	6	8	9	10	11	12	13	14	15	16	18
Volunteer Wheat	1	3	6	8	10	11	12	14	15	16	17	19	21
Volunteer Barley	3	5	8	10	12	14	15	17	18	19	20	23	25

Sources: Dew and Keys, Agriculture Canada (Lacombe, Alberta)
O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Figure 2. Spray Decision Guideline for Wild Oats and Volunteer Cereals in Canola.

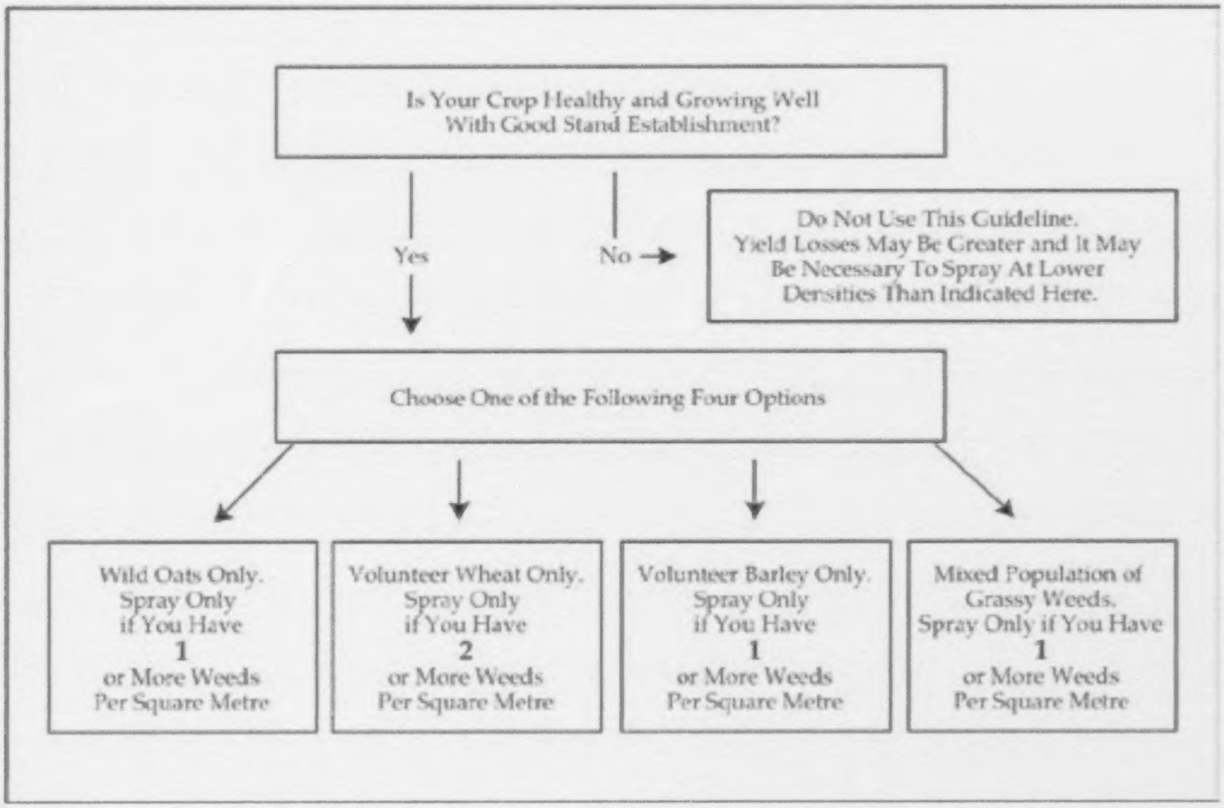
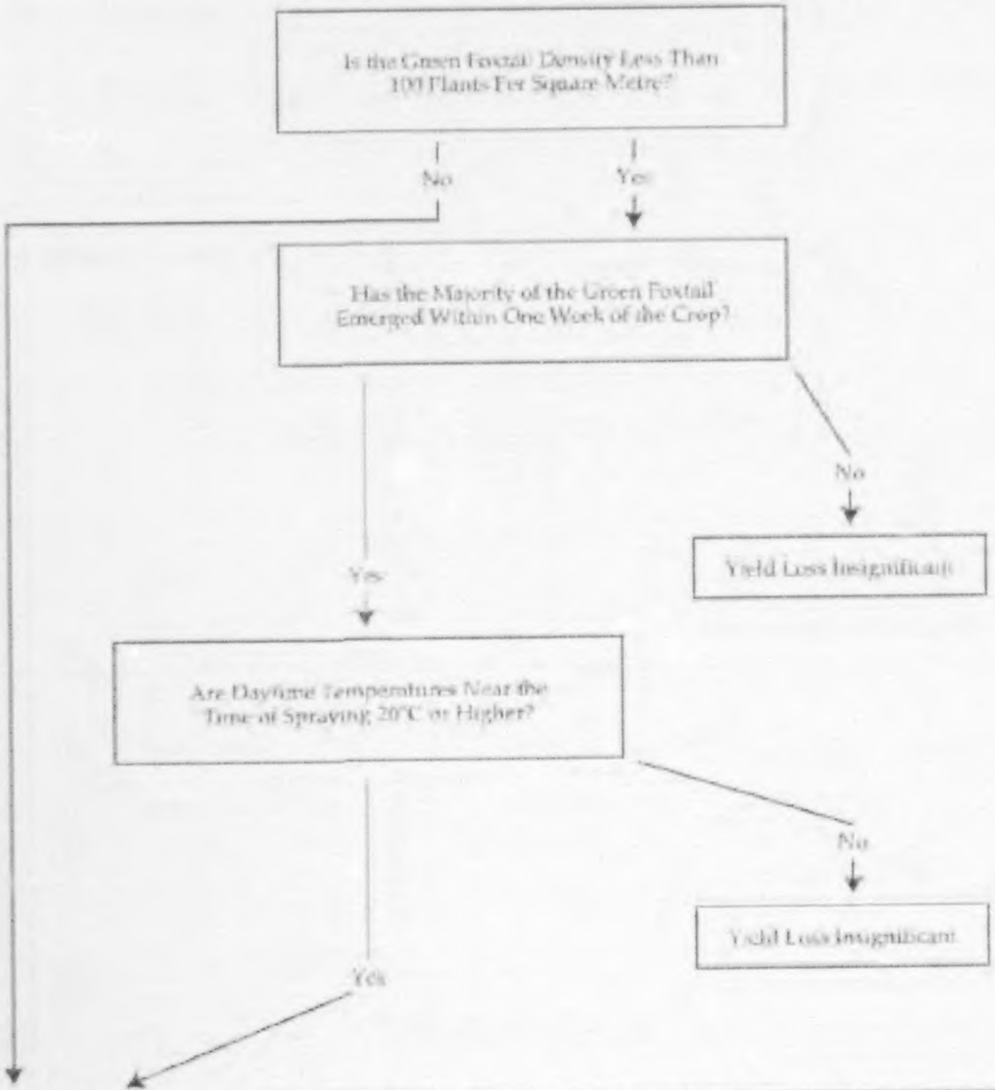

Is Your Crop Healthy and Growing Well With Good Stand Establishment?
Yes
No
Do Not Use This Guideline. Yield Losses May Be Greater and It May Be Necessary To Spray At Lower Densities Than Indicated Here.
Choose One of the Following Four Options
Wild Oats Only. Spray Only if You Have 1 or More Weeds Per Square Metre
Volunteer Wheat Only. Spray Only if You Have 2 or More Weeds Per Square Metre
Volunteer Barley Only. Spray Only if You Have 1 or More Weeds Per Square Metre
Mixed Population of Grassy Weeds. Spray Only if You Have 1 or More Weeds Per Square Metre

Table 6. Yield Losses (Percent) in Canola Caused by Green Foxtail (Wild Millet)


Is the Green Foxtail Density Less Than 100 Plants Per Square Metre?
No
Yes
Has the Majority of the Green Foxtail Emerged Within One Week of the Crop?
No
Yield Loss Insignificant
Yes
Are Daytime Temperatures Near the Time of Spraying 20°C or Higher?
No
Yield Loss Insignificant
Yes

Green Foxtail Density (no. per square metre)	50	75	100	125	150	175	200	250	300	350	400	450	500
Yield Loss (percent)	3	4	5	6	8	9	10	13	15	18	20	23	25

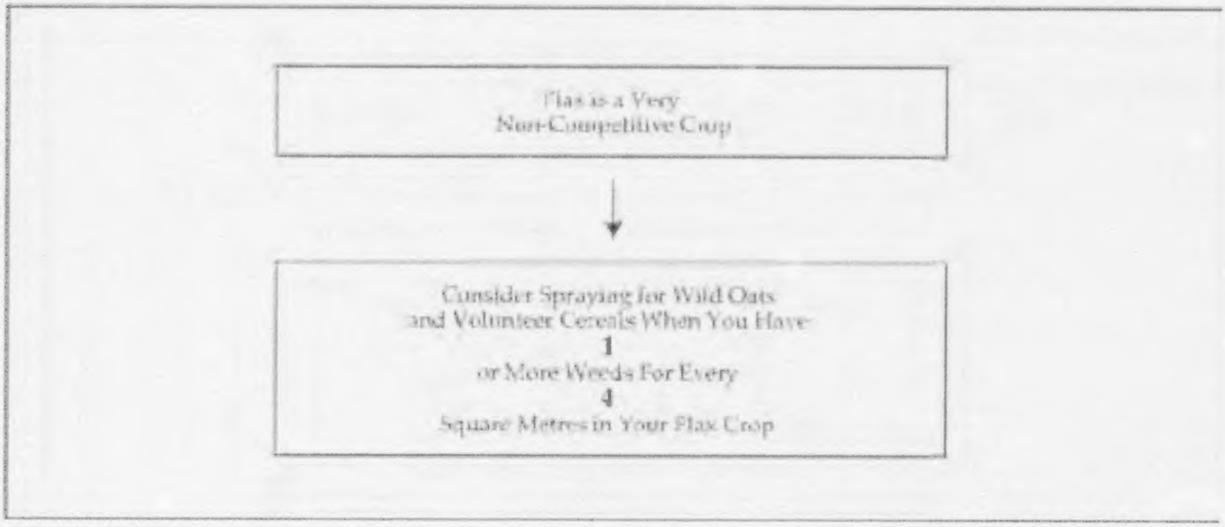
Source: O'Donovan, Alberta Environmental Centre (Vegreville, Alberta)

Table 7. Yield Losses (Percent) in Flax Caused by Wild Oats and Volunteer Cereals.

	Weed Density – Number Per Square Metre									
	1	2	3	4	5	6	7	8	9	10
Wild Oat	6	8	10	12	13	15	16	17	18	19
Volunteer Wheat	6	11	15	18	22	24	27	29	31	33
Volunteer Barley	6	12	16	21	24	28	31	34	36	39

Sources: Dew and Keys, Agriculture Canada (Lacombe, Alberta)
Friesen et al., University of Manitoba (Winnipeg, Manitoba)

Figure 3. Spray Decision Guideline for Wild Oats and Volunteer Cereals in Flax.


Flax is a Very
Non-Competitive Crop
Consider Spraying for Wild Oats
and Volunteer Cereals When You Have
1
or More Weeds For Every
4
Square Metres in Your Flax Crop

Deciding to Spray – Economic Thresholds and Herbicide Resistance

An **economic threshold** is the level of infestation at which lost yield exceeds the cost of the chemical and its application. Determining the economic threshold will help you decide if a spray operation is necessary.

The following example outlines how to determine an economic threshold:

You have a wild oat problem in your wheat. After a thorough field scouting you have determined that your field has an average density of 35 wild oats per square metre. You know that the crop and weeds are at the same leaf stage. Using Table 1, choose the "Same Leaf Stage" row and read across to **35 wild oats per square metre**. You will find that your yield loss will be about **18** percent.

You think it could be a 40 bushel per acre wheat crop, and expect to get $4 per bushel for it. Therefore:

40 bushels x 0.18 (percent of expected yield loss) =
7.2 bushels per acre of lost yield

7.2 bushels x $4 per bushel =
$28.80 per acre of lost income

Now find out the price of your herbicide. Most wild oat herbicides for wheat cost between $20 to $25 per acre. In this case, lost income exceeds the cost of the herbicide and application, so spraying would be justified.

Alternatively, you may want to use the figures provided with some of the yield loss tables. These figures provide flowcharts to assist you in making spray decisions. In some cases the flowcharts may indicate to spray when you do not have an economic threshold weed density, but most times they will prevent you from spraying unnecessarily.

Another factor to consider when deciding whether to spray is your herbicide rotation. A one in three rotation of herbicide groups is currently recommended to delay the development of herbicide resistance for weeds such as wild oats and green foxtail. Skipping a spray operation will give you an extra year of flexibility in your herbicide rotation. This means that you have one extra herbicide group to choose from the year after you skipped the spray operation. When making spray decisions, the ability to rotate herbicides should be considered in addition to the economics of spraying.

Making the Spray Decision

Remember that economic thresholds should be used only as guides when making a spray decision. Lost income caused by dockage or downgrading must also be considered. **FIELDS THAT ARE NOT SPRAYED THIS YEAR HAVE A HIGHER POTENTIAL FOR PROBLEMS THE FOLLOWING YEAR BECAUSE OF WEED SEED RETURN.** A farmer's experience and common sense play an important role when deciding to spray. Used properly, however, the economic threshold can be an important tool in making spray decisions.

Weed Resistance to Herbicides

In recent years, the number of herbicide resistant weeds and the areas they infest have increased.

Most herbicide resistant weed infestations have developed following repeated use of the same herbicide (or herbicide group) for a number of years on the same field. Growers who have developed weed resistance on their farms will typically see a weed, which is normally controlled by a herbicide, escape uncontrolled after a number of years of use of the same product or product group. Individual plants may be resistant to 1.5 up to 10 or more times the normal field rate.

Herbicide Groups

To help you plan your herbicide program, the following table lists "herbicide groups." To slow down the process of developing weed resistance, use products from different groups from year to year on your fields.

Table 1: Herbicide Groups Based on Mode of Action

Group 1 (contain ACCase grasskillers) Axial BIA, Axial iPak*, Axial Xtreme*, Broadband*, clethodim, clodinafop, fenoxaprop, Harmony (SG*, K*), Odyssey Ultra*, Poast Ultra, quizalofop, Signal FSU*, tralkoxydim, Traxos, TraxosTwo*, Tundra
Group 2 (contain ALS/AHAS inhibitors) Accent, Altitude FX / FX2*, Ares, Barricade II*, Battalion*, Broadband*, Enforcer MSU*, Escort, Everest GBX*, Express FX*, florasulam + 2,4-D*, florasulam + Curtail M*, Enforcer MSU, florasulam / fluroxypyr+MCPA*, florasulam + glyphosate, florasulam + MCPA ester, flucarbazone, Harmony (SG*, K*), imazethapyr, imazethabenz, Inferno Duo, Ko-Act*, Korrex*, metsulfuron, Muster, Odyssey, Odyssey Ultra*, Option, Paradigm*, Permit, Pinnacle, Predicade*, Prism, Reclaim*, Retain*, Salute*, Signal FSU*, Simplicity, Solo, Tandem*, Tensile*, Travallas*, tribenuron, tribenuron / metsulfuron, thifensulfuron / tribenuron, thifensulfuron / tribenuron + MCPA*, Triton C*, Triton K*, Ultim, Varro, Velocity m3*, Viper ADV*
Group 3 (contain mitotic inhibitors) Edge, Fortress*, trifluralin
Group 4 (contain growth regulator herbicides) 2,4-D, 2,4-DB, Altitude FX / FX2*, Axial Xtreme*, Barricade II*, Battalion*, BlackHawk*, bromoxynil / 2,4-D ester*, bromoxynil / MCPA ester*, Curtail M, dicamba, dicamba / mecoprop-P / MCPA, dichlorporp / 2,4-D, Distinct*, DyVel, DyVel DSp, Eclipse III*, Enforcer Brands*, Everest GBX*, Express FX*, florasulam + 2,4-D*, florasulam + Curtail M*, florasulam / fluroxypyr+MCPA*, florasulam + MCPA ester, fluroxypyr + 2,4-D, fluroxypyr + MCPA, Glykamba, Grazon, Harmony K*, Hat Trick, Ko-Act*, Korrex*, Lontrel, MCPA, MCPB / MCPA, mecoprop-P, Momentum, Optica Trio, OverDrive*, Paradigm*, Pixxaro, Predicade*, Prestige XC, Pulsar, quinclorac (broadleaves), Reclaim, Restore, Retain*, Salute*, Signal FSU*, Tandem*, Tensile*, thifensulfuron / tribenuron + MCPA*, Tordon 22K, Travallas*, TraxosTwo*, Triton C*, Triton K*

Continued on next page

Group 5 (contain photosynthetic inhibitors – triazines) AAtrex, metribuzin, Primextra II Magnum*, simazine, Velpar
Group 6 (contain photosynthetic inhibitors – nitriles/benzothiadiazoles) Axial iPak*, Basagran Brands, bromoxynil, bromoxynil / 2,4-D ester*, bromoxynil / MCPA ester*, Conquer*, Enforcer Brands*, Infinity*, Tundra*, Velocity m3*, Viper ADV*
Group 7 (contain photosynthetic inhibitors – ureas/amides) linuron
Group 8 (unknown mode of action) Avadex, Eptam-8E, Fortress*
Group 9 (contain inhibitors of EPSP synthase) Glyphosate - several brands. Cleanstart*, Eclipse III*, FlexStar GT*, florasulam + glyphosate, Glykamba*
Group 10 (contain inhibitors of glutamine synthetase) GoodHarvest, Liberty
Group 11 (inhibit carotenoid synthesis - triazoles) Amitrol 240
Group 14 (contain inhibitors of protoporphyrinogen oxidase/PPO/Protox) Aim, Authority, Authority Charge, BlackHawk*, Blazer, CleanStart*, Conquer*, FlexStar GT*, flumioxazin, Focus*, Heat, Reflex
Group 15 (inhibit cell division - benzamides, chloroacetamides) Battalion*, Dual II Magnum, Focus*, Frontier Max, Kerb, Outlook, Primextra II Magnum*
Group 19 (inhibits auxin transport) Distinct*, OverDrive*
Group 22 (membrane rupture, photosynthetic inhibitors) Diquat, Gramoxone, Reward
Group 26 (inhibits cellulose/cell wall formation): Quinclorac (grasses)
Group 27 (HPPD inhibitors – isoxazole) Axial iPak*, Infinity*, topramezone, Tundra*, Velocity m3*

*Products contain more than one active ingredient and appear in more than one group. In some instances, both active ingredients act to kill the same weed using different modes of action. In these instances, use of tank mixes may slow down the process of developing weed resistance.

New herbicides do not necessarily have a unique mode of action and may fall within the groups listed in the charts.

Herbicides that have the same mode of action may not control the same weed spectrum or have the same crop safety. For example, Assert and Ally have the same mode of action; however, Assert controls wild oats while Ally does not.

How Herbicides Work

After applying a herbicide, fields can be scouted to determine the effectiveness of the treatment. The symptoms of different herbicide groups, and the approximate time it takes to develop these symptoms, is listed in the table below. Weed patches that are not affected should be noted and checked, as they may be herbicide resistant. Note that symptoms may take longer to develop when conditions are not conducive to rapid plant growth.

The following table gives a brief description of symptoms that may be exhibited if plants are injured by a herbicide. The symptoms of each group are addressed for both foliar and soil exposures.

Table 2: The Mode of Action, Site of Uptake and Symptoms of Different Herbicide Groups.

Herbicide Group	Mode of Action	Site of Uptake	Weed symptoms/timing	
			Grass weeds	**Broadleaf weeds**
1	Systemic	Foliar	Reduced growth, yellowing of growing point in 1 to 3 weeks. Newest leaf of affected plant pulls out easily in 3 to 5 days.	Tolerant
2	Systemic	Foliar/Soil	Newest leaves yellowed in 3 to 10 days, dead in 1 to 3 weeks.	**Discolored (red/yellow/purple) at the** growing point and spreading to the whole plant in 1 to 3 weeks.
3	Systemic	Soil	Reduced emergence, poor root development of emerged plants. **Roots often swollen/stunted and** root tips darkened.	Reduced emergence, poor root development of emerged plants.
4	Systemic	Foliar	Tolerant to moderate rates. High rates cause symptoms similar to drought. Poor timing may cause kernal abortion.	Abnormal growth (twisted stems, cupped leaves) in 2 to 10 days.
5	Systemic	Soil	Wilted and yellowed oldest leaves, death in 7 to 10 days.	
	Contact	Foliar	**Yellowed oldest leaves, death** within days.	**Bleached oldest leaves, death within** days.
6	Contact	Foliar	Some leaf burn possible.	**Yellowed leaves in 2 to 4 days,** death in 1 to 2 weeks.
7	Systemic	Soil	**Yellowed and stunted plants, death in 10 to 14 days.**	
	Contact	Foliar	Interveinal yellowing of oldest leaves, death within days.	
8	Contact	Foliar	**Yellowed leaves in 3 to 7 days,** stunted plants.	Tolerant
	Systemic	Soil	**Reduced emergence, emerged leaves dark green/blue.**	
9	Systemic	Foliar	Wilted, yellowed leaves in 7 to 10 days. Newest growth is impacted first followed by the rest of the plant.	
10	Contact	Foliar	Wilted, bleached leaves in 3 to 5 days, death in 1 to 2 weeks.	
11	Systemic	Foliar	Plants wilted in 2 to 3 days, bleached and purpling leaves in 1 to 2 weeks.	Plants wilted in 2 to 3 days, bleached leaves in 1 to 2 weeks. Perennial plants die slowly.
14	Contact	Foliar	Some leaf burn at contact points or leaf edges.	**Leaves yellowed and desiccated in** 1 to 3 days. (Post applications)
	Systemic	Soil	**Bleaching and yellowing, death prior** to or shortly following emergence	
15	Systemic	Soil	Reduced emergence, emerged plants stunted.	
19	Systemic	Foliar	Twisting of older leaves, new leaves fail to expand, plant death in 2 to 4 weeks.	
22	Contact	Foliar	**Leaves wilted within hours,** desiccated in 1 to 3 days.	**Leaves wilted in 1 to 3 days, desiccated** and dead in 3 to 7 days.
27	Systemic	Foliar	Some bleaching and whitening of leaves.	**Leaves bleached and whitened in** 2 to 10 days and death in 7 to 10 days.

How to Identify Weed Resistance

It is important to avoid confusing herbicide failure caused by resistance with herbicide failure caused by various other factors (such as weather or application errors). When a herbicide fails to control weeds because of weather or application factors, that herbicide may work in the field the next season. But when herbicides fail because of the development of resistance, they will fail in subsequent years, regardless of weather or application procedures.

Herbicide resistance should be suspected under the following conditions:

- A weed species that the herbicide controlled in previous seasons now escapes the treatment, while other weeds that appear on the label continue to be controlled in the field.
- The escapes cannot be attributed to adverse weather or emergence after application (if a post emergence product is in question).
- Irregular-shaped patches of a weed develop where the herbicide gives little or no control.
- Records of the past history of the field show repeated use of the same herbicide, or combinations of herbicides, that kill the weed in question in the same way.

Table 3: Herbicide-Resistant Weeds in Western Canada

WEED	HERBICIDE GROUP	LOCATIONS CONFIRMED
Canada Fleabane	Group 9	Occurs in several US states
Cleavers	Group 2	AB, MB, SK
	Group 4	AB
	Multiple combinations of: Groups 2 & 4	AB
Chickweed	Group 2	AB, SK
Cow Cockle	Group 2	AB
Green Foxtail	Group 1	AB, MB, SK
	Group 2	MB
	Group 3	AB, MB, SK
	Multiple combinations of: Groups 1 & 3	MB, SK
Hemp-nettle	Group 2	AB, MB
	Group 4	AB
	Multiple combinations of: Groups 2 & 4	AB
Kochia	Group 2	AB, MB, SK
	Group 4	Occurs in North Dakota and Montana
	Group 5	
	Group 9	AB, MB, SK
Lamb's-quarters	Group 2	Occurs in Ontario
	Group 5	Occurs in Ontario
Marshelder (False ragweed)	Group 2	Occurs in North Dakota
Mustard, Ball	Group 2	AB
Mustard, Wild	Group 2	AB, MB, SK
	Group 4	MB
	Group 5	MB
Narrow-leaved hawk's-beard	Group 2	AB
Persian Darnel	Group 1	AB, SK
Redroot pigweed	Group 2	MB, SK
	Group 5	Occurs in Ontario
Russian thistle	Group 2	AB, SK
Shepherd's purse	Group 2	AB, SK
Smartweed, pale	Group 2	MB
Spiny Annual Sow-thistle	Group 2	AB, MB
Stinkweed	Group 2	AB, MB, SK
Wild buckwheat	Group 2	AB
Wild oat	Group 1	AB, MB, SK
	Group 2	AB, MB, SK
	Group 8	AB, MB, SK
	Multiple combinations of Groups: 1 & 2, 1 & 8, 2 & 8, 1, 2 & 8	AB, MB, SK

See Table 1 on page 45 for a complete list of products in each Herbicide Resistance Group.

If Weed Resistance Develops on Your Farm

It is important to identify weed resistance before it spreads across your farm. Plan on conducting a "patch watch" scouting program this summer to identify suspicious patches before they become difficult to manage. Resistant weed patches have been identified on fields where producers were unaware of their existence.

Your patch watch program should begin shortly after spraying and continue through July after the crop has headed out and most weeds are visible from a distance. If you find suspicious looking patches, contact your local agricultural office or crop protection company representative to assist you in confirming weed resistance. If resistance is suspected:

1. Map the location of the patches and mark them with stakes so you will remember their location.

2. Mow, cultivate or spot spray the patches. Resistant patches should not be allowed to produce seed.
3. Patchy areas should NOT be harvested with the rest of the field. Harvest these areas separately, and make sure **to clean all harvesting equipment before leaving the** area to prevent the spread of seeds across the field or to a neighbouring field.
4. Check patches each year to monitor their spread. Keeping your resistant weeds isolated to a manageable patch is easier than dealing with an entire field of resistant weeds.

Adjuvants and Registered Pesticides:

Note - some products are specific about the concentration of active ingredient in the surfactant for product performance. Check with the product page in this guide or the product label.

TRADE NAME	COMPOSITION	REGISTERED PESTICIDES
Addit (PCP#29263)	37% Surfactant blend	*Bison*
Adigor Adjuvant	48.8% methylated rapeseed oil 28.2% ethoxylated alcohol	*Broadband*
Agral 90 (PCP#11809 or 24725),	90% nonylphenoxy polyethoxy ethanol	*Accent, Altitude FX, Battalion,* **diquat,** *Escort,* flucarbazone, glyphosate, *Muster, Pinnacle, Prism,* imazethpyr, metsulfuron, thifensul**furon/tribenuron,** *Reflex, Reward, Triton K, Ultim*
Agsurf II (PCP#30071)	92% Alcohol ethoxylate	
Amigo (PCP#22644), *X-Act* (PCP#28225)	30% phosphate ester surfactant	clethodim[†*]
Assist (PCP#16937), *XA Oil Concentrate* (PCP#11769), *Score* (PCP#12200), *Signal* (PCP#29173), *Steppe* (PCP#29281)	83% paraffin based mineral oil 17% surfactant blend	*AAtrex, Basagran* (all crops), *Blazer,* clodinafop[†*], **clodinafop + bromoxynil/** MCPA ester[†*], *Harmony K**, *Harmony SG**, *Simplicity, Yuma GL* (Not all adjuvants may be used with all herbicides listed)
Citowett Plus (PCP#12766), *Super Spreader* (PCP#17402)	50% Octylphenoxypolyethoxy ethanol	*Accent, AAtrex, Basagran* (peas), *Battalion, Escort,* metsulfuron, *Muster, Pinnacle, Prism,* **thifensulfuron/tribenuron,** *Triton K, Ultim*
Companion (PCP#15882)	70% Octylphenoxypolyethoxy (9) ethanol	*Glyphosate,* metsulfuron, *Muster*
Corn oil (PCP#18473)	99% paraffin based mineral oil 1% surfactant blend	*AAtrex,* linuron
Enhance (PCP#29270 or 29952), *ADAMA Adjuvant 80* (PCP#30419)	80% **triglyceride ethoxylate** 10 POE	*Accent, Battalion,* **diquat,** *Escort,* glyphosate, *Gramoxone, Lontrel, Muster, Pinnacle, Prism,* **imazethapyr, metsulfuron, thifensulfuron/** tribenuron, *Reflex, Reward, Ultim*
Hasten (PCP#27420)	77.4% methyl and ethyl oleate(esterified vegetable oil)	*Option 35DF*
Intake (PCP#31243)	586 g/L **Parrafinic oil** 242 g/L Alkoxylated alcohol	*Liquid Achieve*
LI700 (PCP#23026)	80% surfactant blend	**Diquat, flucarbazone, glyphosate,** *Fulfill insecticide*
Liberate (PCP#29491)	100% lecithin, methyl esters of fatty acids and alcohol ethoxylate	*Battalion, Pursuit, Reflex, Odyssey, Everest,* **thifensulfuron/tribenuron, tribenuron,** metsulfuron (*Accurate*)

Continued on next page

TRADE NAME	COMPOSITION	REGISTERED PESTICIDES
Merge (PCP#24702)	50% solvent 50% surfactant blend	*Ares, quinclorac, Odyssey, Odyssey Ultra, Poast Ultra,* quizalofop, *Solo, Tensile, Triton C*
MSO Concentrate with Leci-Tech (PCP#28385)	70% methylated soybean oil	imazethapyr, *Odyssey, Poast Ultra*
Sure-Mix (PCP#25467)	60% paraffin based mineral oil 40% surfactant blend	quizalofop
Turbocharge (PCP#23135)	50% mineral oil 39.5% surfactant blend	*Achieve Liquid Gold**, Paradigm, tralkoxydim†*

* The adjuvant is packaged with the product.

† Note: All products may not be registered with all adjuvants. See product page in the following sections to determine which adjuvants are registered for each herbicide.

Adjuvants and Your Herbicide

Adjuvants are important ingredients in chemical weed control. Many herbicides must be applied with an adjuvant. If it is forgotten, the level of weed control can vary widely, and re-spraying may be necessary.

Most products have adjuvants built into the formulation. Other require adjuvant addition (e.g. Refine SG). Some adjuvants were developed specifically for one herbicide, and these are either pre-packaged with the herbicide, or are identified by name on the label (e.g. Turbocharge for Achieve, Amigo for Select). Consult a company representative to determine the support for pesticide adjuvant combinations not listed on the product label.

With some products, adjuvants need to be added only under certain conditions. For example, glyphosate products have built-in adjuvants, but require additional adjuvant when low rates (pre-seeding or chem-fallow), high water volumes, or certain tank mixes are used.

Adjuvants should be added only when required. If one is not required, addition can reduce weed control or injure crops. Product labels will describe when an adjuvant is required, and what type should be used.

There are two main classes of adjuvants: "activators or spray modifiers" (these include surfactants and crop oils), and "utility modifiers" (these include pH adjusters, water conditioners, low drift adjuvants, and anti-foaming agents). The most important class of adjuvants is the activators. Surfactants, the main group within the activators, are "*surface active agents.*" These chemicals produce effects at points where two substances touch, such as between two liquids (herbicide and water) or between a solid and a liquid (herbicide and leaf surface). Some surfactants act as dispersing agents, helping to keep a pesticide suspended in water. Others work on the plant, improving the wetting, sticking and penetrating characteristics of the herbicide droplets. Oil-based adjuvants contain petroleum or vegetable oil plus an emulsifier that suspends the oil in tiny droplets within the spray solution. Oil-based adjuvants typically assist in herbicide penetration into the leaf.

There are two basic type of surfactants (ionic and non-ionic), of which the non-ionic are most common. The tables on the previous page list the surfactants registered for use with herbicides in Western Canada.

Crop and Herbicide Recommendation Tables

The following charts give general weed control comparisons based on rates, timing and other application instructions and precautions as outlined in this Guide.

A dot (•) will indicate if the weed is listed on a product label. Where rate ranges are listed for controlling a given weed, ratings are based on results achieved with the higher rate unless noted otherwise. 'S' indicates weed suppression.

Weed Control Tables

Table 1. Weed Control in Barley

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-D										•	•[5]	•		•	•		•	•	•	•			•	•[10]		•	S
Avadex					•																						
Axial BIA		•	•		•																						
Axial Xtreme		•	•		•	S			•					•													
Barricade II						•	•	•	•			•	•	•	•	•	•	•	•		•	•	•	•	•	•	
Broadband		•	•		•	•		•	•				•				•	•		•		S	•			•	
Bromoxynil						•				•				•	•		•[7]	•[7]	•		•		•[7]				
Bromoxynil/2,4-D						•	•			•		•		•	•		•	•	•	•	•		•			•	•
Bromoxynil/MCPA						•	•			•		•		•	•		•	•	•	•	•	•[10]	•	•[10]		•	•
Curtail M						•				•	•[3]	•		S	•		•	•[7]		•[7]	•[7]	•[10]	•	•		•[7]	•
Dicamba + MCPA/2,4-D						•			•	•		•	•[1]	•	•		•	•	•	•	•	•[10]	•	•[10]		•	
Dicamba/Mecoprop/MCPA						•	•		•			•	•	•	•		•	•	•	•	•		•	•[10]		•	•
Dichlorprop/2,4-D						•	•[3]			•		•		•	•	•	•	•	•	•	•	•	•			•	•
DyVel						•			S	•		•	•	•	•		•	•	•	•	•		•			•	•
DyVel DSp						•			S	•		•		•	•	S	•	•	•	•	•	•	•	•[10]		•	
Enforcer D						•[7]	•		•				•	•	•	•[7]	•	•[7]	•[7]	•			•	S	•[7]	•	
Enforcer M						•[7]		•[7]	•[7]	•[7]		•[7]	•[7]	•	•		•	S	•[7]	•[7]	•[7]		•[7]	•[10]	•[7]	•	•[7]
Enforcer MSU						•		•	•	•		•	•	•	•		•	•	•	•	•		•	•[10]	•	•	•
Fenoxaprop		•	•		•																						
Florasulam + *Curtail M*						•		•	•			•[3]	•		•		•	•		•	•	•	•	•		•	
Florasulam + MCPA						•		•	•		•[5]	•	•		•		•	•		•	•	•[10]	•	•[10]		•	•
Floraslum/fluroxypyr + MCPA						•		•	•	•		•	•	•	•		•	•		•	•		•		•	•	
Fluroxypyr + 2,4-D						•		S	•	•	•[5]	•	S	•	•	•	•	•	•	•	•	S	•	S	•	•	•
Fluroxypyr + MCPA						S			•	•		•	•[3]	•	•		•	•		•	S		•		•	•	•
Fortress			•		•	S								S	S			S	S								
Hat Trick						•		•	•		•		•	•	•			•		•		•		•			
Imazamethabenz					•	S											•						•				
Infinity						•		•	•		•[4]	•	•	•	•	S	•	•	•	•	•	S	•	S		•	
Linuron + MCPA amine			S			•		•		•		•	•	•	•		•	•		•	•		•				
Lontrel 360						•																•		•			
MCPA										•	•[10]	•	S	•	•		•	•		•	•		•				
MCPA K										•		•	S		•		•			•			•				
Mecoprop-p								•	•						•		•										
Metribuzin							•	•					•[7]		•		•	•	•		•		•			•	
Metsulfuron								•				•	•		•		•	•	•	•	•	•[3]	•			•	
Momentum						•			•					•										•	•		
Optica Trio						•		•	•					•	•		•	•					•	•[10]		•	
Paradigm						•		•	•		•	•	S	S	•	•	•	•		•	•	S	•		•	•	
Pixxaro						•		•	•	•	•	•	•	•	•	•	•	•		•	•		•		•	•	
Prestige XC						•		S	•		•[3]	•	S	•	•	•	•	•		•	•	•	•	•	•	•	•
Pulsar						•			•					•	S			S	•						•		
Retain						•		•	•			•	•		•		•	•	•	•	•		•			•[2]	•
Thifensulfuron/tribenuron						•		•				•	•		•		•	•	•	•	•		•			•[2]	•
Thifensulfuron/tribenuron + MCPA						•		•			•[6]	•	•	•	•		•	•	•	•	•		•			•	•
Tralkoxydim		•	•		•																						
Travallas							•	•	•		•[4]		•	•	•		•	•	•		•	•	•	•[10]		•[2]	
Tribenuron + 2,4-D						•				•	•[5]	•		•	•		•	•	•	•			•	•[10]		•	•
Trifluralin (green foxtail control)			•																								
Trifluralin (grassy and broadleaf)		•	•		•	•		•							•			•									
Triton C						•		•	•			•	•	•	•	•	•	•	•	•	•		•			•[2]	•
Triton K						•						•		•	•		•	•	•	•			•			•	•
Tundra		•	•		•	•		•	•		•[4]	•	•	•	•	S	•	•	•	•	•	S	•	S		•	

[1] MCPA K mixes only. [2] Will not control CLEARFIELD canola varieties. [3] Spring seedlings only.

[4] Up to 25 cm diameter. [5] Seedlings and overwintered rosettes. [6] Less than 15 cm diameter [7] Controlled at higher rates [10] Top growth control only.

• Control. S - Suppression.

Table 2. Weed Control in Oat

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-Purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-DB					●[6]									●		●	●		●	S[6]	●[6]	●	●[6,7]			
Bromoxynil					●				●				●	●		●[6]	●[6]	●[3]		●		●[6]				
Bromoxynil/MCPA					●	●			●		●		●	●		●	●	●	●	●	●[7]	●	●[7]		●	●
Curtail M					●				●	●[3]	●		S	●		●	●[6]		●	●[6]	●	●	●		●[6]	●
Dicamba + MCPA					●			●	●		●	S	●	●		●	●	●	●	●	●[7]	●	●[7]		●	
Dicamba/Mecoprop/MCPA					●	●		●			●	●	●	●		●	●	●	●	●	●	●	●[7]		●	●
DyVel					●			S	●		●	●	●	●		●	●	●	●	●		●			●	●
Florasulam + *Curtail M*					●		●	●		●[5]	●[3]	●		●		●	●		●	●	●	●	●		●	
Florasulam + MCPA					●		●	●		●[5]	●	●		●		●	●		●	●	●[7]	●	●[7]		●	●
Linuron + MCPA amine			S		●		●		●		●	●		●		●	●		●	●		●				
Lontrel 360					●[6]																●[7]		●			
MCPA									●		●	S	●	●		●	●		●	●		●				
MCPA K									●		●	S		●		●			●			●				
MCPB/MCPA												S		●		●	●		●		●[7]	●	●		●	
Mecoprop-p							●	●						●		●							●[7]			
Optica Trio					●		●	●					●	●		●	●					●	●[7]		●	
Prestige XC					●		S	●		●[3]	●	S	●	●	●	●	●		●	●	●	●	●	●	●	●
Stellar (see Florasulam/fluroxypyr + MCPA)					●		●	●	●		●	●	●	●		●	●		●	●		●		●	●	
Thifensulfuron/tribenuron					●		●				●	●		●		●	●	●	●	●		●			●[2]	●
Thifensulfuron/tribenuron + MCPA					●		●			●	●	●		●	●	●	●	●	●	●	●[7]	●	●[7]		●	●

[1] MCPA K mixes only. [2] Will not control CLEARFIELD canola varieties. [3] Spring seedlings only. [5] Seedlings and overwintered rosettes. [6] Controlled at higher rates.
[7] Top growth control only. S Suppression. ● Registered for control.

Table 3. Weed Control in Rye or Triticale

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp nettle	Kochia	Lamb's-quarters	Mallow, Round leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-D[3,4]										•	•[8]	•		•	•		•	•	•	•		•[10]	•	•		•	S
Bromoxynil[1]						•				•				•	•		•[9]	•[9]	•		•		•[9]				
Bromoxynil/MCPA[1,4]						•	•			•		•		•	•		•	•	•	•	•	•[10]	•	•[10]		•	•
Dicamba + 2,4-D[2,4]						•			•	•		•		•	•		•	•	•	•	•	•[10]	•	•[10]		•	
Infinity[5]						•		•	•		•[6]	•	•	•	•	S	•	•	•	•	•	S	•	S		•	
MCPA[3,4]										•		•	S	•	•		•	•		•	•		•				
Tralkoxydim[3]		•	•		•																						

[1] Fall rye only. [2] Spring rye only. [3] Fall and Spring rye. [4] Rye only: not registered for triticale. [5] Triticale only. [6] Up to 25 cm diameter.
[8] Seedling stage only. [9] Controlled at higher rates. [10] Top growth control only.
• Registered for control. S - Suppression.

Table 4. Weed Control in Wheat (Spring and Winter)

HERBICIDE	PAGE	Crop W-Winter, S-Spring, D-Durum	Barnyard Grass	Foxtail, Green and Yellow	Annual bromes	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp nettle	Kochia	Lamb's-quarters	Mallow, Round leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
2,4-D		W/S/D								•		•	•[6]	•		•	•		•	•	•	•	•		•	S		•	S
Altitude FX[11]		S[11]	•	•	S[10]		•	•		•	•	•		•	•	•	•		•	•		•	S		•		•	•	•
Altitude FX2[11]		S[11]	•	•	S[10]		•	•			•					•	•	S	•	•	S	•	•		•		•	•	
Avadex		S/D					•																						
Axial BIA[7]		W/S		•			•																						
Axial Xtreme		S	•	•			•	S			•					•			S										
Barricade II		W/S/D						•	•	•	•			•	•	•	•	•	•	•	•		•	•	•	•	•	•	
Basagran + 2,4-D[7]		S										•					•		•	S	•	•	•		•			•	
Broadband		S	•	•			•	•		•	•				•				•	•		•		S	•			•	
Bromoxynil		W/S/D						•				•				•	•		•[9]	•[9]	•		•		•[6]				
Bromoxynil/2,4-D		S/D						•	•			•		•		•	•		•	•	•	•	•		•			•	•
Bromoxynil/MCPA		W/S/D						•	•			•		•		•	•		•	•	•	•	•	•[14]	•	•[14]		•	•
Clodinafop		S/D	•	•			•																						
Clodinafop + Bromoxynil/MCPA		S/D	•	•			•	•	•			•		•		•	•		•	•	•	•	•	•[14]	•	•[14]		•	•
Curtail M		S/D						•				•	•[6]	•		S	•		•	•[9]		•	•[9]	•	•	•		•[9]	•
Dicamba + MCPA/2,4-D		W/S/D						•			•	•		•	•[3]	•	•		•	•	•	•	•	•[14]	•	•[14]		•	S
Dicamba/Mecoprop/MCPA		W/S/D						•	•		•			•	•	•	•		•	•	•	•	•	•[14]	•	•[14]		•	•
Dichlorprop/2,4-D		W/S/D						•	•[6]			•		•		•	•	•	•	•	•	•	•	•[14]	•	•[14]		•	•
DyVel		W/S/D						•			S	•		•	•	•	•		•	•	•	•	•	•[14]	•	•[14]		•	•
DyVel DSp		W/S/D						•			S	•		•		•	•	S	•	•	•	•	•	•[14]	•	•[14]		•	•
Enforcer D		S/D						•[9]	•		•		•[9]		•	•	•	•[9]	•	•[9]	•[9]	•	•		•	S	•[9]	•	
Enforcer M		W/S/D						•[9]		•[9]	•[9]	•[9]			•[9]	•	•		•	S	•[9]	•[9]	•[9]		•[9]	•[14]	•[9]	•[9]	•[9]
Enforcer MSU		W/S/D						•		•	•	•		•	•	•	•		•	•	•	•	•		•	•[10]	•	•	•
Everest GBX		S/D		•[1]			•	•			•					•			•	•		•	•				•	•[5]	

Continued on next page.

Table 4. **Weed Control in Wheat (Spring and Winter)** *continued.*

HERBICIDE	PAGE	Crop W-Winter, S Spring, D Durum	Barnyard Grass	Foxtail, Green and Yellow	Annual bromes	Volunteer Corn	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada	Volunteer Flax	Volunteer Mustard, Canola	Volunteer Sunflowers
Fenoxaprop		S/D	•	•			•																						
Florasulam + 2,4-D		S/D						•		•	•	•	•[2]	•	S		•		•	•	•	•	•	S	•	S		•	•
Florasulam + *Curtail M*		S/D						•		•	•		•[2]	•[6]	•		•		•	•		•	•	•[14]	•	•		•	
Florasulam + MCPA		S/D						•		•	•		•[2]	•	•		•		•	•		•	•	•[14]	•	•[14]		•	•
Florasulam/fluroxypyr + MCPA		S						•		•	•	•		•	•	•	•		•	•		•	•		•		•	•	
Flucarbazone		W/S/D		•[1]			•												•	•		•	•					•[5]	
Flumioxazin (*Valtera* only)[15]		W/S		S						•			•			•				•								S	
Fluroxypyr + 2,4 D		W/S/D						•		S	•	•	•[6]	•	S	•	•	•	•	•	•	•	•	S	•	S	•	•	•
Fluroxypry + MCPA		S/D						S			•	•		•	•	•	•		•	•		•	S		•		•	•	•
Focus[15]		W/S	•	•	•[10]		S				•						S			•					•				
Fortress		S/D		•			•									S	S			S	S								
Harmony K		S/D	•	•			•	•		•				•		•[13]	•		•	•	•	•	•		•			•[5]	•
Harmony SG		S/D	•	•			•	•		•				•			•		•	•	•	•	•		•			•[5]	•
Hat Trick		S/D						•		•	•		•		•	•	•			•		•		•		•			
Imazamethabenz		S/D					•												•						•				
Infinity		W/S/D						•		•	•		S	•	•	•	•	S	•	•	•	•	•	S	•	S		•	
Linuron + MCPA amine		S/D						•		•		•		•	•		•		•	•		•	•		•				
Lontrel 360		S						•																•[14]		•			
MCPA		W/S/D										•		•	S	•	•		•	•		•	•		•				
Mecoprop-p		S/D								•	•						•		•										
Metribuzin		S/D							•	•					•		•		•	•	•		•		•			•	
Metsulfuron		S/D								•				•	•	•	•		•	•	•	•	•	•[13]	•	•[13]		•	
Momentum		S/D						•			•					•										•	•		
Optica Trio		W/S/D						•		•	•					•	•		•	•					•	•[10]		•	
Paradigm		W/S/D						•		•	•				S	S	•		•	•		•	•	S	•		•	•	
Pixxaro		W/S						•		•	•	•		•	•	•	•		•	•		•	•		•		•	•	
Predicade		S/D	•	•			•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Prestige XC		W/S						•		S	•		•[6]	•	S	•	•	•	•	•		•	•	•	•	•	•	•	•
Pulsar		S						•			•					•	S			S	•						•		
Retain		S						•		•	•			•	•		•		•	•	•	•	•		•			•[7]	•
Signal SFU		S/D	•	•			•	•		•	•			•	•	•	•	S	•	•	•	•		S	•	S	•	•	•
Simplicity/Simplicity GoDRI		W/S	•	S[1]	•		•	S		•	•		S		•			•		•	S	•	•		•	S		•[5]	
Thifensulfuron/tribenuron		W/S						•		•				•	•		•		•	•	•	•	•		•			•[5]	•
Thifensulfuron/tribenuron + MCPA		W/S						•		•			•[15]	•	•	•	•		•	•	•	•	•		•			•	•
Tralkoxydim		W/S	•	•			•																						
Travallas		W/S								•	•	•	•[1]		•	•	•		•	•	•		•	•	•	•[10]		•[2]	
Traxos		S/D	•	•			•																						
Traxos Two		S/D	•	•			•	•		S	•	•	•[6]	•	S	•	•	•	•	•	•	•	•	S	•	S	•	•	•
Tribenuron + 2,4-D		S						•				•	•[5]	•		•	•		•	•	•	•			•	•[10]		•	•
Trifluralin (foxtail control)		S		•																									
Iriton C		S						•		•	•			•	•	•	•	•[8]	•	•	•	•	•		•			•[5]	•
Iriton K		S						•						•		•	•		•		•	•			•			•	•
Tundra		S	•	•			•	•		•	•		S	•	•	•	•	S	•	•	•	•	•	S	•	S		•	
Varro		W/S	•	S	S[10]		•	•			•				•		S	S	•	•	S	•			•			S	
Velocity m3		W/S	•	S	S[10]		•	•		•	•		S	•	•	•	•	S	•	•	•	•	•	S	•	S		•	

[1] Green foxtail only. [2] Spring seedlings and overwintered rosettes. [3] MCPA K mixes only. [5] Will not control CLEARFIELD canola varieties. [6] Spring seedlings only. [8] Not recommended for all spring wheat varieties. Check product listing for details. [9] Controlled at the higher rates. [10] Tank mix with 2,4-D ester when applying to durum wheat. [11] For use on CLEARFIELD wheat varieties only. [12] Up to 25 cm diameter. [13] Less than 15 cm diameter. [14] Top growth only. [15] Weeds controlled when emerging from seed only (not controlled if emerged at application).

• Registered for control. S - Suppression

Table 5. Weed Control in Corn

HERBICIDE	PAGE	Barnyard Grass	Volunteer Cereals	Foxtail, Green	Foxtail, Yellow	Wild Oats	Quackgrass	Buckwheat, Wild	Catchfly, Night flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed Annual Species, Lady's-thumb	Sow-thistle (Perennial)	Stinkweed	Sunflower, Volunteer	Thistle, Canada	Volunteer Canola
2,4-D										•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2,4-DB								•[6]									•		•	•		•	S[6]	•[6]	•	•[6,7]
Aatrex						•		•								•	•	•			•					
Accent		•		•	S	•	•																			
Basagran/Basagran Forté										•	•	•				•	•	S	S	•	•		•		S	•
Battalion[5]		•		•	•		S	•								•	•	•			•					
Bromoxynil								•				•			•	•	•	•	•		•		•			
Bromoxynil/MCPA								•	•			•		•	•	•	•	•	•	•	•	S	•	•	S	•
Dicamba								•			•				•	•	•	•			•	S			S	
Dicamba + 2,4-D amine								•			•	•	S	•	•	•	•	•	•	•	•	S	•	•	S	•
Distinct												•			•	•		•			•	S				•
Dual II Magnum		•[9]		•[9]	•[9]													S[9]								
DyVel DSp								•			•	•		•	•	•	•	•	•	•	•	•	•		•	•
Focus[8]		•[9]		•[9]	•[9]	S[9]					•[9]					S[9]		•[9]					•[9]			
Frontier Max				•																						
Glyphosate[1, 4]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•[7]
Liberty 200 SN[3]		•		•	•	•	S	•		•		•				•	•	•		•	•	•	•		S	
Linuron		S	S	S	S			•		•			•		•	•		•		•	•	•	•			
MCPA												•		•		•	•			•	•		•			
MCPB/MCPA																•	•	•		•		S	•		S	•
Option 35 DF/Option 2.25 OD[6]		•		•	•					•						•	•	•								
Permit										•		•				•	•	•		•	•					
Primextra II Magnum		•[9]		•[9]	•[9]			•[9]								•[9]	•[9]	•[9]			•[9]					
Simazine		•			•	•		•								•					•					
Topramezone[10]		S		S	S					S						S	•	S			S					
Topramezone + Atrazine		S		S	S					S						•	•	•			•					
Ultim[2, 6]		•	•	•	•	•	•											•								

[1] For use on glyphosate tolerant varieties only. [2] See product page for registered corn varieties. [3] For use on Liberty 200 SN tolerant corn varieties only.
[4] Not all glyphosate products are registered for use on glyphosate tolerant corn. [5] Registered for use in Red River Valley region of Manitoba ONLY.
[6] For use in Manitoba only. [7] Except glyphosate tolerant varieties. [8] Apply prior to seeding or up to 3 days after seeding.
[9] Only controlled when weeds are emerging from seed (not controlled if emerged at application). [10] Must be applied with a tank mix partner.
• Controlled S – Suppression

Table 6. Weed Control in Pea

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's -purse	Smartweed, Annual Species	Sow-thistle (Perennial	Stinkweed	Thistle, Canada	Volunteer canola
Authority/Authority Charge[3]								●[4]			S[4]					●[4]	●[4]		●[4]							
Avadex							●[4]																			
Basagran/Basagran Forté										●	●	●					●	●	S	●	●	●		●	●	●
Clethodim		●	●	●	●	●	●																			
Edge Granular		●[4]	●[4]		S[4]	S[4]	S[4]	●[4]		●[4]	S[4]				S[4]	●[4]	●[4]		●[4]	S[4]		S[4]				
Flumioxazin (Valtera only)			S[4]							●[4]			●[4]			●[4]	●[4]		●[4]							●[4]
Imazethapyr			●[1]				●	S		●	●				●			●	●		●	●		●		●[2]
MCPA Sodium Salt/Amine														●			●	●			●			●		
MCPB/MCPA															●		●	●	●		●		●	●	●	●
Metribuzin										●					●		●	●				●		●		●
Odyssey		●	●[1]		●	●	●	S		●	●			●	S		S	●	●	●	●	●		●		●[2]
Odyssey Ultra		●	●[1]		●	●	●	S		●	●			●	S		S	●	●	●	●	●		●		●[2]
Poast Ultra		●	●	●	●	●	●							●												
Quizalofop		●	●	●	●	●	●																			
Trifluralin (broadleaf & grassy weeds)		●[4]	●[4]				●[4]	●[4]		●[4]							●[4]		●[4]	●[4]						
Viper ADV		●	●		●	●	●	S			S						●	●	●		●	●		●		●

[1] Green foxtail only. [2] Excluding CLEARFIELD varieties. [3] For in season activity only. For initial burn down of other weeds see table 13b. [4] For control of the marked weeds when emerging from seed (not controlled if emerged at application).

● Registered for control. S - Suppression.

Table 7. Weed Control in Other Pulses

HERBICIDE	CROP						ANNUAL WEEDS																				PERENNIALS			
	PAGE	Bean, Dry	Fababean	Lentil	Chickpea	Sweet White Lupin	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Nightshade, Hairy	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Stinkweed	Canada Thistle	Dandelion	Perennial Sow thistle	Quackgrass
Ares				X[9]			•	•	•	•	•	•	•	•	•		•		•	•		•	•	•		•				
Authority/Authority Charge[19]					X								•[18]					•[18]	•[18]			•[18]								
Basagran/Basagran Forté		X[6]	X											•	•	•			•	•	•	S	•	•	•	•	•			
Clethodim		X		X	X		•	•	•	•	•	•																		
Dual II Magnum		X[7]				X	•[18]	•[18]	•[18]													•[18]								
Edge Granular		X[1]	X	X[8]			•	•	•	S	S	S	•	•	S		S	•	•			•	S		S					
Eptam 8-E		X					•	•	•	•	•	•		•					•			•								
Flumioxazin (*Valtera* only)					X			S[18]						•[18]				•[18]	•[18]		•[18]	•[18]								
Frontier Max		X[1]						•																						
Imazethapyr		X[3]																			•									
Linuron						X	S	S	S				•	•								•		•	•	•				
Metribuzin (post-emergence)				X	X									•			•		•	•					•	•				
Metribuzin + Treflan (PPI)			X				•	•	•			•	•	•			•		•	•		•	•	•	•	•				
Odyssey			X	X[9]			•	•		•	•[15]	•	•[13]	•	•		•[13]		S	•		•	•[13]	•	•	•				
Odyssey Ultra				X[9]			•	•	•	•	•	•	S	•	•		S		S	•		•	•	•	•	•				
Permit		X[6]												•		•			•	•		•		•	•					
Poast Ultra		X	X	X	X	X	•	•	•	•	•	•																		•
Quizalofop		X[6]	X	X	X		•	•	•	•	•	•																		•
Reflex + Basagran		X[5]														•			•	•		S		•	•	•				
Solo				X[9]			•	•	•	•	•[15]	•	S		S				•	•		•		•	•	•				
Trifluralin (broadleaf & grassy weeds)		X	X	X			•	•	•			•	•	•					•			•	•							
Viper ADV		X					•	•	•	•	•	•			•				•	•		S	•	•		•				

[1] White and kidney beans only. [2] Pre-emergent surface treatments only. [3] Pinto, pink and red beans only. [5] For use on navy beans in the Red River Valley of Manitoba. Does not include weeds controlled by Basagran Forté. [6] Not all dry bean types have been tested for tolerance to this herbicide. [7] White, kidney and pinto beans only. [8] Fall applications only. [9] For use ONLY on CLEARFIELD lentil varieties. [10] Including Clearfield lentil varieties. [13] Suppression in CLEARFIELD lentils. [14] Not controlled in CLEARFIELD lentils. [15] Not including CLEARFIELD wheat varieties. [17] Apply prior to seeding of or up to 3 days after seeding. [18] For control of the marked weeds when emerging from seed (not controlled if emerged at application). [19] For in season activity only. For initial burn down of other weeds see table 13b.

• Registered for control. S - Suppression.

Table 8. Weed Control in Flax and Solin (Low Linolenic Acid Flax). Not all products are registered for use on Solin.

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Cereals	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Authority/Authority Charge[5]								•			S					•	•			•						
Avadex							•																			
Basagran[1] / *Basagran Forté*										•	•	•					•		•	•	•	•	•		•	•
Bromoxynil[1]								•				•				•	•		•	•	•		•		•	
Bromoxynil/MCPA[1]								•	•			•		•		•	•		•	S	•	•	•	•	•	•
Clethodim[1]		•	•	•	•	•	•																			
Curtail M[1]								•				•	•[2]	•			•		•	•		•	•	•	•	•
Eptam[3] *8-E*		•	•	•		•	•			•							•			•						
Fortress			•	•			•	•								•	•			•	•					
Lontrel 360[1]								•																•		•
MCPA/MCPA K												•	•	•	•		•		•			•		•	•	•
Poast Ultra[1]		•	•	•	•	•	•																			
Quizalofop[1]		•	•	•	•	•	•																			
Trifluralin (broadleaf and grassy weeds)[4]		•	•	•			•	•		•							•			•	•					

• Registered for control. S – Suppression.

[1] Registered for use on both Flax and Solin (low linolenic acid flax). [2] Spring seedlings only. [3] Not recommended for use on flax in Saskatchewan.
[4] Fall application only. [5] For in season activity only. For initial burn down of other weeds see table 13b.

Table 9. Weed Control in Canola

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night-flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Ares[2]		•	•	•		•	•	•	•			•[8]				•		•	•	•[8]	•	•	•	•		•	
Avadex								•																			
Clethodim		•	•	•	•	•	•	•																			
Eclipse[4]			•		•	•	•	•	•	•	•	•		•		•	•	•		•	•	•	•	•	•[7]	•	•[7]
Edge Granular		•	•	•		S	S	S	•		•	S				S	•	•			•	S		S			
Fortress			•	•				•	•								•	•			•	•					
Glyphosate[4,5]		•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Liberty[1]		•	•		•	•[3]	•[3]	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lontrel 360									•																•		•
Muster Toss-N-Go															•	•				•	•			•		•	
Odyssey[2]		•	•			•	•[6]	•	•		•	•			•	•		S		•	•	•	•	•		•	
Odyssey Ultra		•	•	•		•	•	•	•		•	•			•	•		S		•	•	•	•	•		•	
Poast Ultra		•	•	•	•	•	•	•																			
Quinclorac		•	•									•													S		
Quizalofop		•	•	•	•	•	•	•																			
Salute[2]		•	•			•	•[6]	•	•		•	•			•	•		S		•	•	•	•	•	•[9]	•	•[9]
Solo[2]		•	•	•		•	•[6]	•	S			S						•		•	•		•	•		•	
Tensile[2]		•	•	•		•	•	•	•			S						•		•	•		•	•	•[9]	•	•[9]
Trifluralin		•	•	•				•	•		•							•			•	•					

[1] For use **only** on Liberty Link varieties. [2] For use **only** on CLEARFIELD canola varieties. [3] Ratings based on 1.35 L/acre rate of Liberty. Control may be reduced at lower rates. [4] For use **only** on glyphosate tolerant canola varieties. [6] Will not control CLEARFIELD wheat volunteers. [7] Season long control. [9] Top growth control only.

• Registered for control. S – Suppression.

Table 10. Weed Control in Potatoes*

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Volunteer Canola	Volunteer Corn	Volunteer Barley	Volunteer Wheat	Wild Oats	Quackgrass	Chickweed	Dandelion	Hemp-nettle	Lamb's-quarters	Mustard, Wild	Nightshade	Pigweed, Redroot	Pigweed, Prostrate	Purslane	Smartweed (Annual)	Shepherd's-purse	Stinkweed
Chateau (see Flumioxazin)													•		•	•	•				
Clethodim		•	•		•	•	•	•													
Dual II Magnum		•	•												•[2]	S					
Eptam 8 E		•	•			•	•	•	S	•			•		•[3]	•	•	•			
Linuron (pre-emergent use only)		S	•							•			•			•	•	•	•	•	•
Metribuzin [4]				•						•		•	•	•		•			•	•	•
Outlook		•	•												•	•					
Poast Ultra		•	•		•	•	•	•	S												
Prism		•	•						•				S			•					

• Controlled S – Suppression

[1] Will not control glyphosate tolerant varieties. [2] American and Eastern black nightshades. [3] Hairy nightshade.

[4] Consult manufacturer or seed provider for varietal tolerance to Metribuzin.

***Note:** Before using any pesticides on potatoes, consult the list of Agricultural Pesticides Approved for Use, available from Simplot Canada and McCain Foods (Canada).

Table 11. Weed Control in Sunflowers

HERBICIDE	PAGE	Barnyard Grass	Foxtail, Green and Yellow	Quackgrass	Volunteer Barley	Volunteer Wheat	Wild Oats	Buckwheat, Wild	Catchfly, Night flowering	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mallow, Round-leaved	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Assure II (see Quizalofop)		•	•	•[2]	•	•	•																		
Authority /Authority Charge[4]								•			S					•	•			•					
Clethodim		•	•	•[2]	•	•	•																		
Edge Granular		•	•		S	S	S	•		•	S				S	•	•			•	S	S			
Eptam 8E		•	•		•	•	•			•							•			•					
Express SG (see Tribenuron)[5]								S									•								
Imazamethabenz																			•					•	
Muster Toss-N-Go														•	•				•			•		•	
Poast Ultra		•	•	S	•	•	•																		
Solo[3]		•	•		•	•[1]	•	S			S						•		•	•		•		•	
Trifluralin		•	•				•	•		•							•			•	•				

• Registered for control. S - Suppression.

[1] Will not control CLEARFIELD volunteers. [2] Season-long control. [3] Apply only on CLEARFIELD sunflower varieties.

[4] For in season soil activity only. For initial burn down of other weeds see table 13b. [5] ExpressSun (tribenuron tolerant) sunflower varieties only.

Table ??. Weed Control in Soybean

	PAGE	Herbicide Resistance Group	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Nightshade, Hairy	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Stinkweed	Stinkweed	Volunteer Flax	Volunteer Mustard, Canola	Canada Thistle	Dandelion	Perennial Sow-thistle	Quackgrass
Authority/Authority Charge7		14							●		S			●	●			●					●		●[8]				
Basagran/Basagran Forté		6								●	●	●			●	●	●	S	●	●	●	●				●			
Blazer		14										●			●	●		●			●		●			S			
Clethodim		1	●	●	●	●	●	●															●		●				
Dual II Magnum		15	●[6]	●[6]	●[6]													●[6]											
Edge Granular		3	●	●	●	S	S	S	●	●	S		S	●	●			●	S		S		●		●				
Flexstar GT[1, 2]		9/14	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Flumioxazin (*Valtera* only)		14		S											●		●	●					●		●				
Focus[5]		14/15	●[6]	●[6]	●[6]			S[6]			●[6]				S[6]			●[6]				●[6]							
Glyphosate[2, 3]		9	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●
Imazethapyr		2															●												
Liberty 200SN[8]		10	●	●	●			●	●	●		●			●	●		●		●	●	●				S		●	S
Linuron		7	S	S	S				●	●								●		●	●	●							
Metribuzin + Treflan (PPI)		5	●	●	●			●	●	●			●		●	●		●	●	●	●	●	●		●[8]				
Odyssey		2	●	●		●	●[4]	●	●	●	●		●		S	●		●	●	●	●	●							
Odyssey Ultra		1/2	●	●	●	●	●	●	S	●	●		S		S	●		●	●	●	●	●	●	●	●				S
Pinnacle		2													●	●		●			●								
Poast Ultra		1	●	●	●	●	●	●																					●
Quizalofop		1	●	●	●	●	●	●															●		●[8]				●
Reflex + Basagran[1,4]		6/14										●			●	●		S		●	●	●							
Trifluralin (broadleaf & grassy weeds)		3	●[6]	●[6]	●[6]			●[6]	●[6]	●[6]					●[6]			●[6]	●[6]										
Viper ADV		2/6	●	●	●	●	●	●			●				●	●		S	●	●		●							

[1] For use in the Red River Valley of Manitoba only. [2] For use on glyphosate tolerant varieties only. [3] Not all glyphosate products are registered for use on glyphosate tolerant soybeans. [4] Not including CLEARFIELD wheat varieties. [5] Apply in fall or spring prior to seeding of or up to 3 days after seeding. [6] Control of the following weeds emerging from seed (not controlled if emerged at application). See preseed table for emerged weeds controlled by the Aim component. [7] For in season activity only. For initial burn down of other weeds see table 13b. [8] For use in Liberty tolerant soybeans only.

● Registered for control. S - Suppression.

Table 12. Weed Control in Special Crops

HERBICIDE	CROP								ANNUAL WEEDS																							PERENNIALS			
	PAGE	Canaryseed	Safflower	Caraway	Coriander	Buckwheat	Mustard	Oilseed mustard (*Brassica juncea*)	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Buckwheat, Wild	Catchfly, night-flowering	Chickweed	Cleavers	Cocklebur	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Stinkweed	Volunteer Flax	Volunteer Mustard, Canola	Canada Thistle	Dandelion	Perennial Sow-thistle	Quackgrass
Ares								✓[6]	•	•	•	•	•[8]	•				•			•		•	•	•	•	•	•	•		•[8]				
Avadex		✓[1]					✓							•																					
Bromoxynil		✓													•				•			•	•	•	•	•		•	•						
Bromoxynil/MCPA		✓													•	•			•	•		•	•	•	•	•	•	•	•		•	•		•	
Clethodim			✓	✓	✓		✓	✓	•	•	•	•	•	•																					•
Curtail M		✓													•				•	•		S	•	•	•		•	•	•		•	•	•[4]	•	
Dicamba + MCPA		✓													•			•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	
Dicamba/Mecoprop/MCPA		✓													•	•		•		•	•	•	•	•	•	•	•	•	•		•	•		•	
Edge Granular			✓	✓	✓		✓[2]		•	•	•	S	S	S	•		•	S			S	•	•		•	S		S							
Fluroxypyr + MCPA		✓													S			•	•	•	•	•	•	•			•	S	•	•	•				
Fortress							✓			•	•			•	•							•	•		•	•									
Linuron				✓	✓																		•												
Muster Toss-n-Go							✓[3,9]	✓											•	•			•	•			•	•							
Odyssey								✓[6]	•	•		•	•[8]	•	•		•	•		•	•		•	•	•	•	•	•	•		•[8]				
Poast Ultra			✓	✓	✓	✓	✓		•	•	•	•	•	•																					•
Prestige XC		✓													•		S	•		•	S	•	•	•	•		•	•	•	•	•	•	•[4]	•	
Quinclorac							✓		•	•								•																S	
Quizalofop							✓[9]	✓	•	•	•		•	•																					
Solo								✓[6]	•	•	•	•	•[8]	•	S			S					•	•	•		•	•	•		•[8]				
Trifluralin			✓				✓		•	•	•			•	•		•						•		•	•									

[1] Granular formulation only. [2] Yellow mustard only. [3] Brown and oriental mustards only. [4] Spring seedlings only. [5] Oriental mustard only. [6] For use in CLEARFILED varieties only. Non-CLEARFIELD varieties will be severely injured by this treatment. [8] CLEARFIELD varieties not controlled [9] Including Ethiopian mustard (Brassica carinata)

• Registered for control. S - Suppression.

Table 13a. Herbicides to Control Weeds Before Seeding or After Seeding but Prior to Crop Emergence

HERBICIDE	PAGE	**Pre-seeding**	**Pre-emergent**	Barley	Canaryseed	Canola	Chickpea	Corn, Field	Corn, Sweet	Dry Bean	Field Pea	Flax	Forage Grasses	Lentil	Oat	Potatoes	Rye	Soybean	Wheat
Amitrol		✓		✓		✓		✓		✓	✓							✓	✓
CleanStart		✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Glykamba		✓		✓				✓							✓		✓		✓
Glyphosate		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The following products may or must (+) be mixed with glyphosate – for the marked crops																			
Aim		✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓
Authority Charge		✓	✓				✓				✓	✓						✓	
+ 2,4-D (up to 294 gae/acre)		✓	✓	✓													✓	✓[3]	✓
Blackhawk		✓		✓													✓	✓	✓
+ Bromoxynil		✓	✓	✓		✓									✓				✓
+ Bromoxynil/MCPA		✓		✓	✓			✓	✓			✓	✓		✓		✓		✓
+ *Tribenuron/Metsulfuron*		✓		✓															✓
+ Florasulam		✓		✓											✓				✓
+ *Heat*		✓	✓	✓	✓		✓	✓	✓		✓			✓	✓				✓
+ *Inferno Duo*		✓	✓																✓
Conquer		✓				✓													
+ *Express FX*		✓		✓															✓
Ko-Act		✓		✓													✓		✓
+ *Korrex*		✓	✓	✓											✓				✓
+ MCPA (up to 200 gae/acre)		✓		✓			✓[1,2]	✓[2]	✓[2]		✓[1,2]	✓[2]		✓[1,2]	✓		✓		✓
+ tribenuron		✓		✓	✓[3]					✓[3]	✓[3]		✓[3]		✓[3]			✓[3]	✓

[1] Maximum of 140 gae/acre in chickpea, field pea and lentil (see glyphosate page). [2] Amine formulations only. [3] Only for select products. See product page for details.

Table 13b. Weed Control Before Seeding or After Seeding but Prior to Crop Emergence

HERBICIDE	PAGE	Brome, Downy	Foxtail Barley	Foxtail, Green	Quackgrass	Volunteer Cereals	Wild Oats	Buckwheat, Wild	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Narrow-leaved Hawk's-beard	Night flowering catchfly	Russian Thistle	Shepherd's-purse	Smartweed (incl.lady's-thumb)	Stinkweed	Volunteer Canola (including glyphosate tolerant varieties)	Volunteer Flax
Amitrol									•													
CleanStart		•		•		•	•	•	•[2]	•	•	•	•	•	•		•	•	•	•	•	•
Conquer												•							•		•	
Glykamba		•		•		•	•	•		•		•	•	•			•		•	•		
Glyphosate (180 gae/acre)[1]		•	S	•	•	•	•	•	S	•	•	•	•	•	•	S	•	•	•	•		•
Glyphosate (360 gae/acre)[1]		•	•	•	•	•	•	•	S	•	•	•	•	•	•	•	•	•	•	•		•
The following products may or must (+) be mixed with glyphosate – weeds marked are those that the product has activity on in addition to glyphosate																						
Aim/Authority Charge[3]								•				•	•	•						•	•	
+ 2,4-D										•		•	•	•	•		•	•		•	•	
Blackhawk												•		•	•		•	•		•	•	
+ Bromoxynil								•				•	•	•			•		•	•	•	
+ Bromoxynil/MCPA								•		•	•	•	•	•	•	•	•	•	•	•	•	
+ *Express FX*									•			•			•		•	•		•	•	
+ Tribenuron/Metsulfuron									•						•	S					•	
+ Florasulam								•	•	•	•			•	•			•	•	•	•	
+ *Heat*								•	•	•		•	•	•	•					•	•	
+ *Inferno Duo*			•				•		•						•						•	
Ko-Act									•	•	•	•		•	•			•			•	
+ *Korrex*								•			•	•	•	•	•					•	•	
+ MCPA (up to 200 gae/acre)										•	•	•	•	•	•		•	•	•	•	•	
+ tribenuron									•						•		•	•		•	•	

• Controlled S – Suppression

[1] Rates of application varies among brands. Consult the product page for application rates.

[2] Spring seedlings only. [3] Initial burndown only. For extended in season control see *Authority Charge* in crop tables 6,7,8 and 11.

Table 13c. Herbicides for Use as Harvest Aid or Desiccant Before Crop Harvest

HERBICIDE	PAGE	Alfalfa[7]	Barley	Canola	Chickpea	Dry bean	Faba bean	Forage	Field Pea	Flax	Lentil	Oat	Potato	Soybean	Sunflower	Wheat
Aim[3, 4]			✓		✓	✓	✓		✓			✓	✓	✓		✓
CleanStart			✓		✓	✓			✓			✓	✓	✓		✓
Diquat[3, 5]				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Flumioxazin[3]						✓										
Glyphosate			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
Good Harvest		✓									✓[6]		✓[6]			
Heat[3, 4]			✓	✓		✓			✓		✓[8]			✓	✓	✓

[1] Rates of application vary among brands. Consult glyphosate page for specific application rates. [2] For pre-harvest perennial weed control and may provide harvest management benefit. [3] For rapid plant tissue dry down to facilitate harvest. [4] May be tank mixed with glyphosate when used prior to harvest. [5] Refer to product page for surfactant requirements. [6] Not for crops grown for seed. [7] Seed production only. [8] Red lentil only.

Table 14. Weed Control in Fallow

HERBICIDE	PAGE	Brome, Downy	Foxtail Barley	Foxtail, Green	Quackgrass	Wild Oats	Volunteer Cereals	Buckwheat, Wild	Dandelion	Flixweed/ Tansy Mustard	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Narrow-leaved Hawk's-beard	Night flowering catchfly	Pigweed, Redroot	Russian Thistle	Shepherd's-purse	Smartweed (incl. Lady's-thumb)	Sow-thistle (perennial)	Stinkweed	Thistle , Canada	Volunteer Canola (including glyphosate tolerant varieties)	Volunteer Flax
Amitrol									•			•	•				•	•		•		•			
Dicamba + 2,4-D[3]								•		•		•	•	•			•	•		•			S		
Dicamba/Mecoprop/MCPA								•		•		•	•	•			•	•		•			S	•	
DyVel DSp								•		•		•	•	•			•	•		•			S		
CleanStart		•		•		•	•	•	•[2]	•	•	•	•	•	•			•	•	•		•		•	•
Glykamba		•		•		•	•	•		•		•	•	•				•		•		•			
Glyphosate (180 gae/acre)[3]		•	S	•	S	•	•	•	S	•	•	•	•	•	•	S	•	•	•	•	S	•	S	•[2]	•
Glyphosate (360 gae/acre)[3]		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•[2]	•
The following products may or must (+) be mixed with glyphosate – weeds marked are those that the product has activity on in addition to glyphosate																									
Aim								•				•	•	•	•							•		•	
+ *Blackhawk*												•		•	•		•	•	•			•		•	
+ 2,4-D										•		•	•	•	•	•		•	•			•		•	
+ Bromoxynil								•				•		•				•		•		•		•	
+ Bromoxynil/MCPA								•		•	•	•	•	•		•	•	•	•	•		•		•	
+ *Distinct* (low rate)								•	•[1]				•		•		•						•[1]		
+ *Florasulam*								•	•	•	•		•		•				•	•		•		•	
+ *Heat*								•	•	•		•	•	•	•		•					•		•	
+ *Ko-Act*									•	•	•	•		•	•				•					•	
+ *Korrex*								•			•	•		•	•				•	•		•		•	
+ tribenuron									•									•	•			•		•	
+ tribenuron/metsulfuron									•			•			•	S				•			S[4]	•	
Distinct (high rate)								•	•[1]				•		•		•					S	•[1]	•	

• Controlled S – Suppression

[1] Top growth control only. [2] Not including glyphosate tolerant canola.

[3] Rates of application varies among brands. Consult the product page for application rates. [4] Fall rosettes and spring seedling.

Table 15. Post-harvest Fall Weed Control in Stubble

HERBICIDE	PAGE	Flixweed	Narrow-leaved Hawk's-beard	Shepherd's-purse	Stinkweed	Thistle, Canada	Quackgrass	Dandelion
2,4-D		•		•	•	S		S
Amitrol						S		
Dicamba + Glyphosate		•		•	•	S	S	
Dicamba/ mecoprop/MCPA		•		•	•	S		
Distinct (low rate)[G]			•			•[1]		•[1]
Distinct (high rate)			•			•[1]		•[1]
DyVel DSp		•		•	•	S		
Express Pro[G]			•					•
Florasulam + glyphosate		•	•	•	•			•
Glykamba		•		•	•	S	S	
Glyphosate		•	•		•	•	•	•
MCPA		•		•	•	S		S
Tribenuron[G]		•	•			•		•

• Control S – Suppression. Levels of suppression vary depending on the product and growing conditions in the fall. Regrowth and in-crop treatments can be expected.

[1] Top growth control only.

[G] To be used only in a mix with glyphosate.

Table 16. Weed Control in Grass Pastures and Hayfields

HERBICIDE	RATE (per acre)	PAGE	Absinth	Bindweed, Field	Burdock	Thistle, Canada	Dandelion	Dock, Curled	Daisy, English	Flixweed	Foxtail Barley	Gumweed	Narrow-leaved Hawk's-beard	Knapweed	Leafy Spurge	Nodding Thistle	Poplar	Pussy Toes	Red Bartsia	Sage, Pasture	Snowberry	Sow-thistle, Perennial	Stinkweed	Tansy, Common	Wild Rose	Willow	Wormwood, Biennial
2,4-D (500 g/L)	0.57 - 1.82 L[1]		S	S	●	S	S	●		●		S	●		S	S	S	S	●	S	S	S	●				●
2,4-DB	0.71 - 1.72 L[1]			S		S	S	●[3]					●[3]									S	●				
Dicamba	0.85 - 1.86 L[1]			S		S	S	S	S					S	S					S	●	S		S			
Dicamba + 2,4-D	0.85 + 0.89 L[1]		S	S	●	S	S	S	S	●		S			S	S	S		●	S	●	S	●	S	●	S	
Escort	10 - 12 g					S	●										●[3]					S		●	●	●[3]	
Grazon	2.8 L				●	●	●	●																			
Kerb	0.36 - 0.45 kg										●																
MCPA (500 g/L)	0.7 - 1.9 L[1]			S		S	S	S		●		S			●[3]							S	●	S			●
MCPB/MCPA	1.11 - 1.72 L			S		S																S	●				
Overdrive	115 g						S								S												●
Reclaim	20 acre per case					●	●													●		●			●		
Restore II	15 acre per case		●		●	●	●	●		●		●		●								●		●			
Tordon 22K	0.45 - 1.8 L			●[2]		●								●	●[2]					●							

• Controlled. S Top growth suppression only. [1]Rates may vary between different brands. Check product page for specific rate for product and use.
[2]May require multiple applications for complete control. [3] Controlled by the highest rate within this range.

Table 17. Weed Control in Shelterbelts

HERBICIDE	USE				SHELTERBELT SPECIES												WEEDS																				
	PAGE	Before Planting	After Planting (New & Established)	Established	American Elm	Birch	Caragana	Crabapple	Green Ash	Juniper	Lilac	Manitoba Maple	Poplar	Scots Pine	Siberian Elm	Willow	Barnyard Grass	Foxtail, Green and Yellow	Wild Oats	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Dandelion	Flixweed	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Pigweed, Redroot	Quackgrass	Russian Thistle	Shepherd's-purse	Smartweed, Annual Species	Sow-thistle (Perennial)	Stinkweed	Thistle, Canada
Amitrol				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Casoron			●		●		●	●	●	●	●	●			●	●		●		●	●						●	●	●	●	●		●	●			
Glyphosate		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Gramoxone			●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●		●	
Linuron				●	●		●		●			●		●	●	●	●	●		●	●						●	●		●				●		●	
Simazine				●	●		●		●			●			●		●	●[1]	●	●								●						●			
Trifluralin		●		●	●		●		●					●	●		●	●	●	●	●							●		●		●					

• Controlled
[1] Yellow foxtail only.

Table 18a - Weed Control in Forage Crops - Crops

	GRASSES																						LEGUMES								COVER CROPS				
HERBICIDE	PAGE	Altai Wild Rye Grass	Bromegrass	Creeping Red Fescue	Crested Wheatgrass	Intermediate Wheatgrass	Kentucky Bluegrass	Meadow Fescue	Meadow Foxtail	Millets	Northern Wheatgrass	Orchardgrass	Pubescent Wheatgrass	Reed Canarygrass	Russian Wild Ryegrass	Ryegrass, Annual	Ryegrass, Perennial	Slender Wheatgrass	Streambank Wheatgrass	Tall Fescue	Tall Wheat grass	Timothy	Western Wheatgrass	Alfalfa	Alsike Clover	Cicer Milkvetch	Red Clover	Sainfoin	Sweet Clover	Trefoil, Bird's-foot	White Dutch Clover	Barley	Flax[16]	Oats	Canola	Wheat
2,4-D[8]		X	X	X	X	X	X	X	X	S	X	X	X	X	X	X		X	X	X	X	X	X									X				X
2,4-DB[8]			S[4]	S[4]	S[4]	S[4]		S[4]				S[4]							S[4]	S[4]	S[4]	S[4]		S	S		S			S	S	X		X		X
Avadex BW[18]																								S[1]	S[1]		S[1]		S[1]	S[1]		X	X		X	X
Basagran[8]			S[2]	S[2]	S[2]				S[2]	S		S[2]										S[2]		X[2]	X[2]		X[2]	X[2]	X[2]				X			
Bromoxynil[8]			S[2]	S[2]	S[2]	S[2]		S2		S		S[2]		S[2]	S[2]			S[2]			S[2]	S[2]		X[2]								X	X	X		X
Bromoxynil / MCPA ester[8]			S[2]	S[2]	S[2]	S[2]		S[2]	S[2]			S[2]		S[2]	S[2]			S[2]	S[2]	S[2]	S[2]	X										X	X	X		X
Clethodim[8]																								S									X		X	
Curtail M																						E										X	X	X		X
Dicamba + 2,4-D			S	X[2]	S	S		S	S			S	S					S	S	S	S	S										X				X
Dicamba / Mecoprop / MCPA[8]			X[9]	X[9]	X[9]	X[9]	E[9]	E[9]	X[9]			X[9]	E9					E[9]	E[9]	E[9]	E[9]	X[9]	E[9]									X		X		X
Edge[18]																								S[7]											X	
Eptam 8-E[18]																								S		S[2]			S[2]	S						
Fenoxaprop[8]																	S[2]																			
Florasulam + *Curtail M*			X[2]	X[2]	X[2]	X[2]											X[2]			X[2]		X[2]										X		X		X
Florasulam + MCPA[8]																						X														
Fluroxypyr / 2,4-D			X[2]	X[2]	X[2]	X[2]														X[2]		X[2]														
Gramoxone																								E[9]						E						
Heat[18]			S[2]																													X[2]		X[2]		X[2]
Imazamethabenz[8]																X[2]																				
Imazethapyr[8]																								X[15]											X[11]	
Infinity			E														X					X[2]										X				X
Kerb																								E						E						
Lontrel		X	X	X	X	X	X	X	X			X		X	X			X	X	X	X[9]	X										X	X	X	X	X
MCPA[8]			X[8,9]	X[8,9]	X[8,9]	X[8,9]	X[8,9]	X[8,9]				X[8,9]		X[8,9]	X[8,9]	X[8,9]		X[8,9]			X[8,9]	X[8,9]		S[5,6]	S[5]		S[5]					X	X	X		X
MCPB - MCPA[8]		S[4]	S[4]	S[4]	S[4]	S[4]		S[4]			S[4]		S[4]	S[4]	S[4]			S[4]	S[4]	S[4]	S[4]	S[4]	S4	S[2,8]	S		S					X		X		X
Metsulfuron[8]				X	X	X						X										E[8,17]										X				X
Odyssey																								X[2]						X[2]						
Poast Ultra				X[2]																				X	X	X		X	X				X		X	
Prestige XC			X[2]	X[2]	X[2]	X[2]														X[2]		X[2]										X				X
Princep Nine-T																								E						E						
Quizalofop[8]																								X[2]	X[2]	S[2]	X[2]	S[2]	S[2]	S[2]	S[2]		X		X	
Thifensulfuron / Tribenuron[8]			X	X	X	X	E				X	X	X					X	X	X	X		X									X		X		X
Tralkoxydim[8]			X[2]	X[2]	X[2]	X[2]					S[2]							S[2]					S[2]	S[1]	S[1]		S[1]	S[1]	S[1]	S[1]	S[1]	X				X
Trifluralin[8, 18]																								S[13]	S[14]	S[14]	S[14]	S[12]	S[12]	S[14]			X[7]		X	
Velpar DF CU																								E												

S - seedling only. E - Established only. X - seedling or established. [1]Underseeded only. [2] For seed production only. [4]Do not graze or harvest for livestock in the year of treatment. [5]Use MCPA sodium salt on seedling forages only when underseeded to flax, oats, wheat or barley. Do not use on Flemish varieties of alfalfa. [6]For use as a spot treatment only control red bartsia. [7]Apply to fall prior to seeding. [8]All products may not be registered for crops and weeds indicated. Check product labels. [9]For forage production only. [10]Check recommendations for varietal restrictions. [11]CLEARFIELD v arieties only. [12]Liquid formulations in spring only. [13]Bonanza 10G, Treflan E.C. (spring only). [14]Treflan E.C. in spring only. [15]Apply to seedlings stands that will be in production for three years after application and establishment stands that will be in production for 2 years after application. [16]May not include Solin (low linolenic acid flax). Check product label for restrictions. [17]Fall application only. [18]For application prior to emergence of the crop.

Table 18b - Weed Control In Forage Crops - Weeds

HERBICIDE	GRASSES							BROADLEAVED WEEDS																																			VOLUNTEER			
	PAGE	Barnyardgrass	Foxtail Barley	Foxtail, Green	Foxtail, Yellow	Quackgrass	Wild Oats / Tame Oat	Blue Bur	Buckwheat, Wild	Burdock	Catchfly, Nightflower	Chickweed	Cleavers	Cockle, Cow	Cocklebur	Dandelion	Dock, Curled	Flixweed	Goat's beard	Goosefoot, Oak leaved	Hawk's beard, Narrow-leaved	Hemp-nettle	Knotweed, Prostrate	Kochia†	Lamb's quarters	Lettuce, Prickly	Mustard, Wild	Pigweed, Prostrate	Pigweed, Redroot	Pigweed, Russian	Plantain, Common	Radish, Wild	Ragweed, False / Giant	Russian Thistle	Scentless Chamomile	Shepard's Purse	Smartweed, Lady's thumb	Sow Thistle (Annual)	Sow Thistle (Perennial)	Stinkweed	Sunflower, Prairie / Annual	Thistle, Canada	Cereal Grains (wheat, barley)	Flax	Canola	Alsike Clover
2,4-D								●		●					●	T	●	●[5]	●	●	●[5]			●	●	●	●	●	●		●	●	●	●		●[5]	●	●	T	●[5]	T	T			●	
2,4-DB									●							T	S			●	●				●		●		●		●		●			●	S		T	●		T				
Avadex BW							●[2]																																							
Basagran												●	●		●										●		●	S				●		S		●	●			●		T			●	
Bromoxynil								●	●					●	●									●	●		●	●	●	●				●			●			●						
Bromoxynil / MCPA ester[8]								●	●		●			●	●			●						●	●		●		S[4]					●	●[5]	●	●		T	●		T			●	
Clethodim		●		●	●	S	●																																				●			
Curtail M									●	●					●	●[7]		●[5]						S	●	●	●		●	●	T	●	●		●[5]	●[5]	●	●	T	●[5]	●	T			●	
Dicamba + 2,4-D								●	●	●			●	●	●			●	●		●[5]			●	●	●	●		●	●	●	●	●	●		●	●		T		●	T			●	
Dicamba / Mecoprop / MCPA									●		●		●	●				●				●	●	●	●		●	●	●					●		●	●	●	T	●	●	T			●	
Edge		●		●	●		S[2]		●			●	S	●								S		●	●			●	●					S			S						S			
Eptam 8-E		●		●	●	S	●					●													●			●	●														●			
Fenoxaprop		●		●	●		●[2]																																							
Florasulam + *Curtail M*									●			●	●			•		●[5]				●			●		●		●							●	●	●	S	●		●			●	
Florasulam + MCPA									●	●		●	●	●		S		●				●			●	●	●		●	●	T					●	●	S	T	●	●	S			●	
Fluroxypyr / 2,4-D								●	●	●		S	●		●	●[5,6]	●[5]	●	●	●[5]				●	●	●	●		●[6]		●	●	●	●[6]		●	●[6]	S	T	●	●	T		●	●	
Gramoxone		●		●	●		●[2]	●	●		●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●		●	●		●	●	●	
Imazamethabenz							●		S																		●													●						
Imazethapyr				S																							●		●							S	●			●					●[1]	
Infinity									●			●	●			S		●				●		●	●		●		●					●		●	●	●	S	●		S			●	
Kerb			●			●	●					●																															●			
Lontrel									●																										●				T			●				●
MCPA								●		●					●		●	●		●		S[3]		●	●	●	●		●	●			●	T		●[5]		T	T			T				
MCPB + MCPA																	●					S			●		●		●		●	S	●			●		S	T	●[5]		●			●	
Metsulfuron								●	S			●		●				●				•			S		●	●	●					S	●	●	●	S	S	●		S			●[1]	
Odyssey		●		●			●		S			●	●					●				S			S		●		●					●		●	●			●			●[1]		●[1]	
Poast Ultra		●	S	●	●	S	●																																				●			
Prestige XC									●			S	●			●[5]		●[5]				S		●	●		●		●	●					●	●	●	●	S	●	●	S		●	●	
Princep Nine-T		●			●		●[2]		●																●								●				●									●
Quizalofop		●	S	●	●	S	●																																				●			
Thifensulfuron / Tribenuron									●			●	S	●				●			●	●			●		●		●					●	S	●	●		S	●	●	S			●[1]	
Tralkoxydim		●		●	●		●																																							
Trifluralin		●		●	●		●[2]		●			●		●									●		●				●					●												
Velpar DF CU																T					●														●				T							

• Controlled by rates recommended for crops. S – Suppression. T– Top Growth Control. [1]Will not control CLEARFIELD varieties. [2] For control of wild oats only. [3]Controlled by MCPAK only. [4]Controls redroot pigweed only when a cereal cover crop is used. [5]Spring seedlings only. [6]Controlled only when growing rapidly [7]Spring germinating rosettes.

†Note: Surveys have found that 90% of fields have group 2 resistant kochia. Group 2 herbicides alone will not likely provide effective control.

Special Weed Problems

This section identifies specific weeds and some herbicides recommended for control. Refer to the particular crop section or the product label for information on specific products that may be used on the crops and for application instructions.

Absinthe

2,4-D LV Ester (500 g/L) - In grass pastures with no legumes, spray 1.82 L/acre in late June, prior to flowering. Re-treat regrowth in late summer when plants have 6 to 10 inches (15 to 25 cm) of new growth. More than 1 season of treatment may be required.

dicamba - In grass pasture and rangeland only, apply 0.5 L/acre in 20 to 30 gallons (90 to 135 L) per acre for top growth control when leaves are fully expanded.

Restore/Restore II - In grass pastures and rangeland, apply *Restore A* at 0.2 L and *Restore B* at 1 L per acre (one package treats 15 acres) or *Restore II* at 0.97 L/acre (one 10 L jug treats 10 acres) when actively growing.

Alders

2,4-D LV Ester (500 g/L) - In grass pastures and non-crop land, apply 1.78 L/acre to the foliage of actively growing brush.

dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures, rangeland and non-crop land, apply dicamba at 2.1 L per 1,000 L of water with 2,4-D LV ester or amine at 4.0 L per 1,000 L of water to the foliage of actively growing brush in the spring or early summer and wet the foliage until the point of runoff.

Aspen Poplar (Trembling Aspen)

dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures, rangeland and non-crop land, apply dicamba at 1.32 L/acre with 2,4-D LV ester or amine at 1.78 L/acre in 20 gallons/acre (90 L/acre) water to the foliage of actively growing brush in spring or early summer.

Baby's Breath (Perennial)

dicamba - In grass pastures with no legumes, apply 3.72 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water when actively growing.

Biennial Wormwood

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L/acre to the foliage of actively growing plants.

Overdrive - In grass pastures and non-crop land, apply at 115 g per acre for control.

Restore II - In grass pastures, apply 0.97 L/acre (one 10 L jug treats 10 acres).

Black Medic

Dichlorprop/2,4-D; Mecoprop-p; dicamba/mecoprop/MCPA; 2,4-D amine or LV ester - Apply in registered crops at registered rates to black medic in the 1 to 4 leaf stage for suppression only.

Chokecherry

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L/acre to the foliage of actively growing brush.

Common Tansy

Glyphosate - Apply at 1.9-2.8 L/acre in 10 gallons of water/acre (40 L/acre) to actively growing plants that are 8-10 inches (20-25 cm) tall (summerfallow, stubble and noncropland).

Escort - In pastures, rangeland and rough turf, apply 8 g/acre in 10 to 20 gallons/acre (45 to 90 L/ acre) of water to actively growing plants of less than 4 inches (10 cm) tall. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.97 L/acre (one 10 L jug treats 10 acres) for suppression.

Curled Dock

dicamba - As a patch treatment or in pasture and rangeland, apply 0.92 L/acre Banvel II in 10 to 20 gallons/acre (45 to 90 L/acre) water to actively growing weeds for top growth control.

Glyphosate - As a spot treatment, apply 2.83 to 4.86 L/acre (360 g/L formulations or equivalent of other formulations) in 10 gallons/acre (45 L/acre) water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment.

MCPA amine, 2,4-D amine - Apply 0.445 to 0.69 L/acre of formulations containing 500 g/L MCPA or 2,4-D amine to give top growth control

Dichlorprop/2,4-D - 0.71 L/acre for suppression before plants are 2 inches (5 cm) tall.

Diffuse and Spotted Knapweed

dicamba - In grass pastures, rangeland and non-crop land, apply at 1.86 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water to actively growing weeds.

Restore II - In grass pastures and rangeland, apply *Restore II* at 0.57 L per acre when actively growing.

Tordon 22K - In rangeland and grass pasture, apply 0.91 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Downy Brome and Japanese Brome

Altitude FX/FX2 - Apply at label rates to suppress Japanese brome to the 4 leaf stage in CLEARFIELD wheat.

Ares - Apply at label rates to suppress Japanese brome to the 4 leaf stage in CLEARFIELD canola and lentils.

Glyphosate - Prior to crop emergence, apply 0.51 to 0.77 L/acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons/acre (23 to 45 L/acre) water before downy brome is 6 inches (15 cm) in height.

Glykamba - Prior to crop emergence, apply 1.0 L/acre in 5 to 10 gallons/acre (23 to 45 L/acre) water between emer gence and heading of downy brome.

Odyssey Ultra - control spring seedlings of Japanese brome in registered crops with Poast Ultra tank mix.

Florasulam + glyphosate - Apply in spring or fall, prior to seeding cereal crops or in fallow at registered rates to control downy brome up tot he 4 leaf stage.

Simplicity - Suppression of downy brome and control of Japanese brome up to the 6 leaf stage when applied at registered rates in the fall in winter wheat. Apply in spring at registered rates to control Japanese brome up to the 6 leaf stage in winter or spring wheat (including durum).

Solo - Apply at label rates to suppress Japanese brome to the 4 leaf stage in registered crops.

Tandem - Applied at the maximum labelled rate in spring wheat (including durum) will control Japanese brome up to the 6 leaf stage.

Trifluralin - Apply at recommended rates for weed control in broadleaf crops prior to emergence.

Velocity m3 - Apply at registered rates in registered crops to suppress Japanese brome.

Viper ADV - In field peas, at registered rates to suppress Japanese brome.

Field Bindweed

dicamba - As a patch treatment or in rangeland, apply 1.0 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water. Apply when field bindweed is in the flowering stage and allow 3 weeks after treatment before resuming normal summerfallow tillage.

Basagran - In labelled crops, apply 0.71 L/acre followed by 0.71 L/acre 7 to 10 days later. Apply in 20 to 35 gallons/acre (90 to 160 L/acre) water before field bindweed has developed a dark green colour and before it has begun trailing. Use a recommended surfactant (see recommendations under the appropriate crop).

2,4-DB - As a spot treatment in labelled crops apply 2.83 to 4.86 L/acre in 10 gallons/acre (45 L/acre) water at the bud stage. Do not disturb plants for at least 10 days following treatment. Heavy rainfall within 2 hours of application may wash chemical off the foliage and a repeat treatment may be required. Rainfall occurring within 6 hours after application may reduce control.

2,4-D amine - In grass pastures containing no legumes or as a spot treatment, apply 1.82 L/acre of formulations containing 500 g/L 2,4-D amine at early flowering stage.

Glyphosate - As a spot treatment, apply 2.8 to 4.9 L/acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons/acre (45 to 135 L/acre) at the full bloom stage or beyond. Allow 7 or more days after application before tillage.

Restore II - For season long control in grass pastures and rangeland only, apply Restore II at 0.97 L/acre.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) for spot treatment, using hand wand application equipment only, to a maximum of one acre of every two acre area of land, of water to actively growing weeds. WARNING - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Field Horsetail

Amitrol 240 - Apply 5.0 to 6.7 L/acre in 10 to 30 gallons/acre (45 to 135 L/acre) water in non-cropped areas and pastures when the weed is young and actively growing.

MCPA amine, potassium and sodium salt mixtures - Apply 0.57 L/acre of formulations containing 500 g/L MCPA after the weeds have fully emerged for top growth control. May be used in wheat, oats, barley, flax and rye.

Foxtail Barley

Glyphosate - Prior to crop emergence, apply 1 to 2 L/acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons/acre (23 to 45 L/acre) water to foxtail barley at the seedling to heading stage. Late fall applications may provide better control of established plants than spring applications.

Glyphosate - In glyphosate tolerant canola, apply 2 applications, each at 0.5 L/acre (360 g/L formulations or equivalent of other formulations), for season long control.

Glykamba - Prior to crop emergence, apply 1.26 L/acre in 5 to 10 gallonslacre (23 to 45 Llacre) water to foxtail barley before initiation of the seed head for suppression only.

Gramoxone - Apply 2.23 L/acre in 98 gallons/acre (445 L/acre) water or 75 mL in 2.2 gallons (10 L) water/1076 square feet (100 sq. m) for top growth control only.

Kerb - Apply registered rates in 20 gallons/acre (90 L/acre) water between October 1 and freeze-up. Use the lower rate on grey wooded soils or where perennial bluegrass or fescues are the predominant pasture species. Do not use Kerb for foxtail barley removal in seed grass stands or desired foliage stands of timothy or fescue grass species. At recommended rates, pasture stands of perennial bluegrass and fescue may be reduced by 10 to 15 percent. Where perennial bluegrass and fescues are the dominant pasture species, use the lower rate of Kerb. Spray overlaps may seriously harm desirable pasture grass species. Where the grass stand comprises mostly foxtail barley and reseeding to a desirable grass species is required, delay seeding into the Kerb-treated soil until the end of June. Do not harvest or graze within 60 days of application with Kerb. Avoid using Kerb on soils having more than 6 percent organic matter.

Goat's-Beard

2,4-D amine - Apply 0.91 L/acre of formulations containing 500 g/L in early fall or early spring.

dicamba - In grass pasture and rangeland only, apply 1.86 L/acre in 20 to 30 gallons (90 to 135 L) per acre when leaves are fully expanded.

Dichlorprop + 2,4-D - Apply 1.62 L/acre in early spring or fall.

Gumweed

2,4-D LV ester - In grass pastures and non crop land, apply 2,4-D LV ester (500 g/L) at 0.89 L/acre to the foliage of actively growing plants.

Hemp Dogbane

2,4-D amine or LV ester - Apply 1.38 to 1.82 L/acre of formulations containing 500 g/L 2,4-D in fall before frost and while plant leaves are green.

Glyphosate - Apply 2.83 to 4.86 L/acre (360 formulations - see glyphosate page for other rates) when hemp dogbane is in the early bud stage. Apply in 10 gallons/acre (45 L/acre) water. Do not disturb treated plants for at least 7 days after application.

Hoary Cress

Amitrol 240 - For non-selective patch treatment in pastures and non-crop land, apply 8.9 to 13.8 L/acre.

Glyphosate - As a spot treatment in labelled crops, apply 2.83 to 4.86 L/acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons/acre (45 to 135 L/acre) water when most plants have reached the early bud stage. Do not disturb treated plants for at least 10 days following treatment.

Leafy Spurge

Amitrol 240 - Apply 15.2 to 18.5 L/acre in 10 to 30 gallons/acre (45 to 135 L/acre) water in non-cropped areas and pastures when the weed is between the late stages of flowering and early seed development.

dicamba - Apply 0.84 L/acre in 10 to 20 gallons/ acre (45 to 90 L/acre) water for top growth control when the weed is actively growing. Patch treatment or pasture.

2,4-D amine - Apply 1.82 L/acre of formulations containing 500 g/L 2,4-D at early flowering stage. Repeat at least once to new growth later in the season. Control of established plants and new seedlings will require continued applications for a period of at least 4 to 5 years.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Overdrive - In grass pastures and non crop land, apply at 115 g per acre for top growth control.

Locoweeds, Lupines, and Milk-vetches

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 to 2.75 L/acre at the full bloom stage.

Milkweed

Amitrol 240 - Apply 7.6 to 11.3 L/acre in 10 to 30 gallons/acre (45 to 135 L/acre) water in non-cropped areas and pastures in the early summer when all the shoots have emerged.

Glyphosate - When making Preharvest applications, use 1.0 L/acre (360 g/L formulations or equivalent of other formulations). For patch treatments, apply 4.86 L/acre (360 g/L formulations or equivalent of other formulations) in 10 gallons/acre (45 L/acre) water. Apply when most plants have reached the bud to bloom stage. Reduced results may occur on plants treated after full bloom as not all milkweed plants reach the required stage of growth at the same time. Repeat treatments may be required. Do not disturb plants for 10 days following treatment. Do not apply to plants covered with dust.

Narrow-leaf Hawk's-beard

2,4-DB - Apply to forage legume crops at recommended rates at the 2 to 4 leaf stage of narrow-leaf hawk's-beard, after legume growth in the fall has stopped.

2,4-D LV ester (600 g/L) - In fall stubble, apply 0.57 to 0.90 L/acre to fall rosettes. Apply to fall seedlings or spring seedling to the 2 leaf stage at 0.22 to 0.38 L/acre or 0.4 to 0.6 L/acre in spring prior to bolting to control.

Barricade, thifensulfuron/tribenuron, Triton C, Triton K - Up to 4 inches tall in registered crops.

Tribenuron/metsulfuron - Up to 3 inches tall with residual activity, prior to the seeding of registered crops.

Distinct - Apply in fallow or post-harvest at 58 g/acre (with 180 to 360 g ae/acre glyphosate) or 115 g/acre.

Express SG - For season long control in range and pasture at the early bud - pre bloom stage.

Florasulam + glyphosate - up to 8 cm tall prior to seeding registered crops.

Florasulam + 2,4-D - Up to 2 leaf stage in registered crops.

Glyphosate - Prior to crop emergence, apply 0.51 to 0.77 L/acre (360 g/L formulations or equivalent of other formulations) in 5 to 10 gallons/acre (23 to 45 L/acre) water. Use the high rate if narrow-leaf hawk's beard is between 3 and 6 inches (8 to 15 cm) in height.

Glyphosate - In glyphosate tolerant crops, apply 0.5 L/acre (360 g/L formulations or equivalent of other formulations) at the 0 to 6 leaf stage. Not all products are registered. Check glyphosate pages.

Heat - Apply in a mix with glyphosate for rapid burndown prior to seeding.

Tribenuron - Apply 4 g per acre of 75% WG formulations or 6 g per acre of 50% SG formulations in a mix with glyphosate prior to seeding.

Velpar - Apply in late fall or early spring for control in established alfalfa in forage and seed production.

Pasture Sage

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.2 L/acre to the foliage of actively growing plants.

dicamba - In grass pastures, rangeland and non-crop land, apply dicamba at 1.86 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water to actively growing weeds.

Reclaim - In grass pastures and non-crop land, apply Reclaim A at 92 g per acre plus Reclaim B at 0.8 L per acre (20 acres per case) for 2 years of control.

Tordon 22K - In rangeland and grass pasture, apply 1.82 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Perennial Smartweed

Glyphosate - Apply 2.0 L/acre (360 g/L formulations or equivalent of other formulations) in 10 gallons/acre water. Apply when vines are a minimum of 8 inches (20 cm) tall, but before flowering.

Poplar

dicamba + 2,4-D - In grass pasture and rangeland only, apply dicamba at 2.1 L plus 2,4-D 500 amine at 4 L or 2,4D 600 ester at 3.3 L per 220 gallons (1000 L) of water and apply by wand to the point of runoff when leaves are fully expanded.

Glyphosate - As a non-selective spot treatment, apply 1.21 to 2.43 L/acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons/acre (45 to 135 L/acre) water in the summer through early fall when brush is actively growing.

Poverty Weed

dicamba - As a spot treatment or in grass pasture or rangeland apply 1.86 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water when weed is actively growing. Dicamba at 0.61 L/acre will provide only top growth control.

Restore II - For season long control in grass pastures and rangeland, apply Restore II at 0.97 L/acre (on 10 L container treats 10 acres).

Tordon 22K - In rangeland and grass pasture, apply 1.82 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Prairie Everlasting, Prairie Sage

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L/acre to the foliage of actively growing plants in the early fall, and repeat in the spring.

Purple Loosestrife

(dryland situations only)

Glyphosate - Apply 2.43 L/acre (360 g/L formulations or equivalent of other formulations) in 30 to 60 gallons/ acre (135 to 270 L/acre) water when purple loosestrife is actively growing and at or beyond the bloom stage. If using hand held equipment, apply a 1 to 2 percent solution until plants are wet. Use a 33 percent product solution if using a wiper applicator. Do not treat plants over open water. If possible, remove and destroy the flower heads before treatment to ensure prevention of seed set. For large monocultures of purple loosestrife, gradually work from the periphery inward over a number of years to allow competing vegetation to invade the treated area. Sprayed areas should be monitored for new seedlings to prevent re-infestation of purple loosestrife.

Red Bartsia

2,4-D amine or LV ester - Apply 0.57 L/acre of formulations containing 500 g/L 2,4-D in 10 gallons/acre (45 L/acre) water. On hayland, treat within 10 days after first cutting. Roadsides and pastures should be sprayed as soon as the red bartsia appears, usually in early July. Repeat treatment if necessary for later germination.

Roses

dicamba + 2,4-D amine or LV ester (500 g/L) - IIn grass pastures, rangeland and non crop land, apply dicamba at 1.48 L/acre with 2,4-D LV ester or amine at 1.78 L/acre to the foliage of actively growing brush in the spring or early summer.

Escort - In pasture and rangeland, apply Escort at 0.012 kg/acre with non - ionic surfactant at 0.2 L per 100 L spray solution in 10 to 20 gallons/acre (45 to 90 L/acre) water. Apply between mid-June and mid-August after the brush has leafed out, but before the leaves begin to turn their fall colours.

Reclaim - In grass pastures and non-crop land, apply Reclaim A at 92 g per acre plus Reclaim B at 0.8 L per acre (20 acres per case) for 2 years of control.

Russian Knapweed

Tordon 22K - In rangeland and grass pasture, apply 1.82 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

dicamba - In grass pasture and rangeland only, apply 3.72 L/acre in 20 to 30 gallons (90 to 135 L) per acre when leaves are fully expanded.

Restore II - In grass pastures and rangeland, apply *Restore II* 0.97 L/acre (one 10 L jug treats 10 acres) when actively growing for suppression.

Saskatoon

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L/acre to the foliage of actively growing brush.

Scentless Chamomile

Bromoxynil/MCPA ester - Apply in registered crops at label rates when scentless chamomile is in the 2 to 4 leaf stage.

Curtail M - In registered crops, apply 0.81 L/acre in 10 gallons/acre (45 L/acre) water when scentless chamomile is actively growing and in the 2 to 4 leaf stage.

dicamba - Apply 0.51 L/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water to actively growing weeds for top growth control.

Escort - In pastures, rangeland and rough turf, apply 8 g/acre in 10 to 20 gallons/acre (45 to 90 L / acre) of water to actively growing plants of less than 4 inches (10 cm) tall. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Express SG - Apply in a mix with glyphosate prior to seeding registered follow crops.

Liberty - In registered crops, apply 1.1 L/acre to plants up to 4 inches (10 cm) in height.

Lontrel - In registered crops, apply 0.23 L/acre in 10 gallons/acre (45 L/acre) water when scentless chamomile is actively growing and in the 2 to 4 leaf stage.

metsulfuron plus 2,4-D - Apply 3 g/acre metsulfuron plus 0.34 to 0.45 L/acre 2,4-D LV ester or amine (500 g/L formulations) in 10 gallons/acre (45 L/acre) water for control of scentless chamomile up to the 4 leaf stage in wheat, barley, and creeping red fescue. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Restore II – In grass pastures and rangeland, apply Restore II at 0.86 L/acre (one 10 L container treats 11.6 acres) when actively growing.

Thifensulfuron/tribenuron - Apply 8 g/acre of DG formulations or 12 g/acre of Refine SG in 10 gallons/acre (45 L/acre) water to actively growing seedlings for suppression. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Tordon 22K - In rangeland and grass pasture, apply 0.445 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water-soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Triton C - Apply at label rates to suppress scentless chamomile up to 10 cm across or high.

Stinging Nettle

2,4-D amine - Apply 0.91 to 1.82 L/acre of formulations containing 500 g/L 2,4-D amine.

Stork's Bill

Altitude FX, Ares, Everest GBX, florasulam + MCPA, Prestige XC, Pulsar, Stellar, Tandem, thifensulfuron/tribenuron, Trophy - Apply at label rates to provide suppression in registered crops. See product pages for Crops, Rates and Staging.

Basagran – In registered crops apply 0.91 L/acre at the 2 to 6 leaf stage.

Dichlorprop/2,4-D - Apply at 0.71 L/acre to registered crops when stork's-bill is in the 2 to 4 leaf stage.

Fluroxypyr + 2,4-D, OcTTain - Apply at the maximum labelled rate to registered crops when stork's bill is in the 1 to 8 leaf stage.

Liberty - in registered crops apply 1.35 L/acre to plants in 1 to 3 leaf stage.

Linuron - Apply with MCPA amine in registered crops at registered rates to stork's-bill in the 2 to 4 leaf stage.

Metsulfuron - Apply with 2,4-D or MCPA amine or LV ester in registered crops at registered rates to stork's-bill in the 2 to 4 leaf stage.

Odyssey – in registered crops, apply 17 g/acre plus adjuvant.

Glyphosate - in glyphosate tolerant crops, apply 0.5 L/acre (360 g/L formulations or equivalent of other formulations) from emergence to the 6 leaf stage.

Spectrum - In registered crops apply at 20 acres per case to control from the 2 to 4 leaf stage.

Toadflax (Yellow)

Amitrol 240 - Apply 7.6 to 11.3 L/acre in 10 to 30 gallons/acre (45 to 135 L/acre) water in non-cropped areas and pastures when the weed is in the advanced rosette to prebud stage.

Dichlorprop/2,4-D - Apply 0.71 L/acre in 10 to 18 gallons/acre (45 to 80 L/acre) water in wheat or barley for toadflax suppression. Apply when majority of toadflax is no taller than 6 inches (15 cm). The use of Dichlorprop/2,4-D for suppression of toadflax in wheat or barley should be part of a long-term planned approach for toadflax control, which includes spring and fall tillage, fall patch spraying, fallow.

Glyphosate - Apply 2.83 to 4.86 L/acre (360 g/L formulations or equivalent of other formulations) when most plants have reached the early bud stage of growth. Allow 7 more days after application before tillage. A rate of 1.0 L/acre may be used with Preharvest applications or when controlling in summerfallow situations.

Metsulfuron plus 2,4-D - Apply 2 to 3 g/acre Ally plus 0.34 to 0.45 L/acre 2,4-D LV ester or amine (500 g/L formulations) in 10 gallons/acre (45 L/acre) water for toadflax suppression in wheat, barley, and creeping red fescue. Add non-ionic surfactant at 0.2 L per 100 L of spray solution.

Thifensulfuron/tribenuron - In registered crops, apply 8 g/acre of DG formulations or 12 g/acre of Refine SG in 10 gallons/acre (45 L/acre) water for suppression of toadflax. Apply when toadflax is less than 15 cm (6 inches) in height. Add non-ionic surfactant at 0.2 L per 100 L spray solution.

Tordon 22K - In rangeland and grass pasture, apply 3.6 L/acre in 90 to 180 gallons/acre (400 to 800 L/acre) of water to actively growing weeds. WARNING - Picloram is a very persistent and water soluble herbicide. Do not apply to permeable soil. Do not apply to irrigated areas. Take special precautions to prevent drift.

Western Snowberry (Buckbrush)

2,4-D amine or LV ester (500 g/L) - Apply 1.82 L/acre 2,4-D amine or LV ester in a minimum of 20 gallons/acre (90 L/acre) water in spring or early summer. Retreatment may be necessary the following year.

Dicamba plus 2,4-D LV ester (500 g/L) - Apply 1.48 L/acre dicamba tank mixed with 1.82 L/acre 2,4-D LV Ester in 20 gallons/acre (90 L/acre) water in spring or early summer after the leaves are fully expanded.

Escort - Apply 10 g/acre in 10 to 20 gallons/acre (45 to 90 L/acre) water between mid-June and mid-August after the brush has leafed out, but before the leaves turn their fall colours.

Reclaim - In grass pastures and non-crop land, apply Reclaim A at 92 g per acre plus Reclaim B at 0.8 L per acre (20 acres per case) for 2 years of control.

White Cockle

2,4-DB - Apply Embutox 625 at 1.1 L/acre or Caliber 400 at 1.7 L/acre or Cobutox 600 at 1.1 L/acre for top growth control to registered crops only.

Express SG - Apply in a mix with glyphosate prior to seeding registered follow crops to control spring rosettes.

Mecoprop - Apply 2.2 L/acre in 18 gallons water/acre (*80 L/acre) for top growth control of established plants. Will also control seedlings. Apply to registered crops only.

Wolf Willow (Silverwillow)

Dicamba + 2,4-D amine or LV ester (500 g/L) - In grass pastures with no legumes, apply dicamba at 2.1 L per 1000 L of water with 2,4-D LV ester or amine at 4.0 L per 1000 L of water to the foliage of actively growing brush in the spring or early summer and wet the foliage until the point of runoff.

Reclaim - In grass pastures and non-crop land, apply Reclaim A at 92 g per acre plus Reclaim B at 0.8 L per acre (20 acres per case) for 2 years of control.

Wild Tomato

2,4-D or MCPA amine or ester (500 g/L) - Apply 0.34 to 0.45 L/acre to registered crops up to the 8 leaf stage of wild tomato.

Bromoxynil+MCPA ester - Apply 0.40 L/acre to registered crops from the 1 to 6 leaf stage of wild tomato.

Willow

2,4-D LV ester - In grass pastures and non-crop land, apply 2,4-D LV ester (500 g/L) at 1.78 L/acre to the foliage of actively growing brush.

Dicamba + 2,4-D - In grass pasture and rangeland only, apply dicamba at 1.7 L plus 2,4-D 500 amine at 3.24 L per acre in 20 to 30 gallons (90 to 135 L) of water per acre when leaves are fully expanded.

Glyphosate - As a non-selective spot treatment, apply 1.21 to 2.43 L/acre (360 g/L formulations or equivalent of other formulations) in 10 to 30 gallons/acre (45 to 135 L/acre) water in the summer through early fall when brush is actively growing.

Soil Residual Herbicides

When applied at recommended rates in a crop, most herbicide residues will disappear within a few weeks after application and impose no restriction on cropping options the next year. However, some herbicide residues do not degrade quickly, and can persist in the soil for months or years following application, thereby restricting the crops that can be grown in rotation. Herbicide residues in the soil are deactivated in various ways including:

- Break down by chemical reactions,
- Break down by soil microbes,
- Escape to the atmosphere as a gas (volatilization),
- Break down by light (photodegradation),
- Leaching,
- Binding to soil particles.

Herbicides often disappear from the environment by more than one of these mechanisms. Many herbicides considered to be non-residual are bound temporarily to soil particles while they are broken down gradually by either soil microbes or chemical reactions. The binding action insures that the herbicide is not available to the crop in quantities that will cause damage.

As a general rule, breakdown processes are favoured by warm, moist soil conditions. During the winter, when the ground is frozen, and in the summer when the soil is dry, herbicide degradation is reduced. The residual activity of certain herbicides is also affected by soil organic matter and soil pH. These soil factors are seldom uniform across a field.

Herbicide carryover is aggravated by low levels of organic matter and is more likely to occur on eroded hilltops than in other parts of a field. The risk of herbicide carryover will also be greater in sprayer overlaps which are most common around headlands and slough margins.

Growers should be aware of the residual properties before applying any herbicide if they are to avoid cropping restrictions in following years. Knowledge of the limitations associated with herbicides that leave a soil residue, along with an accurate record of application (i.e. rates, locations) will serve to minimize rotational problems. Each herbicide used in mixes should be considered separately.

Soil tests using chemical extraction cannot always give a good indication of the potential injury risk from herbicide residue because of the influence of organic matter, clay and pH. Because of this, a field bioassay or laboratory bioassay, where plants are grown directly in the treated soil are best for detecting the potential for injury. These tests are not intended to be used to shortcut restrictions on the label, but provide information on rotational crops where none is available.

Injury symptoms from other causes can resemble herbicide carryover injury (i.e. cold weather, flooding, drought, insects, diseases, etc.). Consult with your local agronomist on potential causes before spending money on testing.

Herbicides that leave a soil residue and are of particular concern in Western Canada are found in the following chart.

Re-cropping Restrictions for Residual Herbicides:

Figures listed are the number of cropping seasons before each crop can be grown ("1" means that the crop can be grown the year following application). For plant-back restrictions less than one season; the delay is indicated with a "d" for number of days or with "mths" for the number of months. A blank space means that there are no recommendations given on the product label and a field bioassay is recommended by many product manufacturers to determine if these crops are safe to plant. A field bioassay is a strip of a test crop that covers an area of the field that is representative of the field variation and should include an untreated area.

PRODUCT	Alfalfa	Barley	Canaryseed	Clearfield canola	Non-Clearfield canola	Fababeans	Field corn	Dry beans	Field peas	Flax	Forage grasses	Lentils	Mustard†	Oats	Potatoes	Rye	Soybeans	Sunflowers	Wheat (durum)	Wheat (spring)	Wheat (winter)
2,4-D*	1	1	1	1	1		1	1	1	1	1	1		1		1			1	1	1
Accent	10 mths	10 mths		10 mths	10 mths		10 mths										10 mths			1	4 mths
Altitude FX/FX2		1		1	1				1	1		1	2	1				1		1	3 mths
Amitrol 240		1d	1	1d	1d		10d*	10d*	5d*	1		1	1	1			6d	1	1d	1d	1d
AAtrex, Primextra II Magnum						1*	1		1*	1*											
Ares		1	1	1	2		1		1	2		1		1				2	2	1	
Authority / Authority Charge	1	1		1	1		1		0	0		2					0	0	1	1	1
Avadex	0	0	0	0	0	1	1	1	0	0		1	0	2		1	1	1	0	0	0
Barricade, Enforcer Brands, Fluroxypyr + 2,4-D, Fluroxypyr+MCPA, Predicade, Retain, Signal FSU, TraxosTwo	2	1	2	1	1	2	2	2	1	1	1	1	1	1	2	1	2	2	1	1	1
Battalion		1					1														1
Quinclorac		0		1	1				1	2		2						1	0	0	
Curtail M, Prestige XC	2	1	2	1	1	2	1	2	1*	1	1	2	1	1		1	2	2	1	1	1
Dicamba*		1		1*	1*		1	1*						1			1		0*	0*	1
Dual II Magnum							1								1		1				4.5 mths
Eclipse III, Lontrel 360		1		1	1				10 mnths*	1	1		1	1		1			1	1	
Edge	0		2	0	0	0		0	0		2	0	0	2			0	0	1*	1*	
Flextstar GT							10 mths	10 mths									10 mths			10 mths	4 mths
Florasulam/fluroxypyr + MCPA		1		1	1				1					1					1	1	1
Florasulam + glyphosate (prior to Aug 1)		0d		1	1				1					0d					0d	0d	0d
Flucarbazone, Everest GBX (Brown soils)																				1	
Flucarbazone, Everest GBX (Dark Brown soils)		1*		1*	1*				1*	1*									1	1	
Flucarbazone, Everest GBX (Black soils)		1*		1*	1*			1*††	1*	1*									1	1	
Flucarbazone, Everest GBX (Grey-Wooded soils)		1*		1*	1*				1*											1	
Flumioxazin (Crop uses)	1	1		1	1		1	1							1		0	1	1	1	1
Focus							1														
Frontier Max, Outlook							0*	0*													1
Florasulam + MCPA, florasulam + 2,4-D, florasulam + Curtail M ***		1		1	1		1	1	1*	1		1	1	1	1		1	1	1	1	1
Hat Trick		1		1	1					1				1					1	1	1

PRODUCT	Alfalfa	Barley	Canaryseed	Clearfield canola	Non-Clearfield canola	Fababeans	Field corn	Dry beans	Field peas	Flax	Forage grasses	Lentils	Mustard†	Oats	Potatoes	Rye	Soybeans	Sunflowers	Wheat (durum)	Wheat (spring)	Wheat (winter)
Imazamethabenz (Black and Grey Wooded soils)		1	2	1	1				1	1				2				1	1	1	
Imazamethabenz (Brown and Dark Brown soils)		1	2	1	2				2	2				2				1	1	1	
Imazethapyr	1	1		0					0			1								1	
Infinity / Tundra / Velocity m3	1	1	1	1	1		1		1	1		2		1			1		1	1	
Kerb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Korrex		0		1	1		1	1	1	1		1	1	0	1		1	1	0	0	0
Metrbuzin				2	2	0			0						0*		0*	2			
Metsulfuron (pH less than 7, Brown and Dark Brown		1	4		2					2		3	4	1					1	1	
Metsulfuron (pH less than 7, other soils)		1	4		1					1		3	4	1					1	1	
Metsulfuron (pH 7 to 7.9, Brown and Dark Brown soils)		1	4		3					3		4	4	2					1	1	
Metsulfuron (pH 7 to 7.9, other soils)		1	4		2					3		4	4	1					1	1	
Muster	2	1	2		2	2		2	2	1	2*	2	2	1					1	1	1
Odyssey*, Odyssey Ultra*	1	1	1	1	2		1		1	2		1		1				2	1	1	
Option	1	1		1	1		1	1	1					1	1		1			1	1
Paradigm		1		1	1				1	1		2	1				1			1	
Permit		2 mths		2	2		1 mth	0	1					2 mths	1		1	2	2 mths	2 mths	2 mths
Pixxaro		1		1	1		1		1	1		2	1	1			1	1		1	
Prism		1					1								1		1				0
Pulsar	2	1	2	1	1	2	2	2	1	1	1	1	1	2	2	1	2	2	1	1	1
Reflex*							1	0									1			1	0
Salute		1		1	1				10 mths	1	1		1	1		1			1	1	
Signal FSU		1		1	1				1	1	1	1	1	1		1			1	1	
Simplicity		1		1	1				1	1		1	1	1			1			1	
Solo, Viper ADV		1	1	1	1				1	1		1	2	1					1	1	
Tandem		1		1	1				1	1		1	1	1						1	
Travallas		10 mths		10 mths	10 mths				10 mths	10 mths				10 mths					10 mths	10 mths	
Tribenuron / Metsulfuron		1d		10 mths	10 mths				10 mths										1d	1d	1d
Trifluralin	0	1*	2	0	0	0	1*	0	0	1*	2	0	0	2		0	0	0	1*	0*	1*
Triton C*		0		1	1				1	2*		2*						1	0	0	
Ultim		1					1														1
Varro	1	1	1	1	1		1	1	1	1		1		1			1	1	1	1	10m

* The minimum re-cropping intervals are listed. These intervals may be longer than those listed depending on the use rates, region, province, soil types, environment, time of application and crop varietiy. Refer to product page for more information.

** Drought restrictions apply to drought conditions (80% of normal June to September rainfall) for high pH soils (greater than pH 7.5) and severe drought (less than 65% of normal June to Sept. rainfall) for all soils.

*** May not be supported for all products. see product page for details.

† May not be valid for all varieties or crop types. See product page for details.

†† DO NOT grow dry beans the year following Everest GBX application.

0 - May be seeded or reseeded the year of application. No re-cropping restrictions. 1 - Next cropping season after application. 2 - Two cropping seasons after application. NR - Not recommended.

Note: The re cropping intervals listed may not be sufficient to prevent crop injury during periods of below average rainfall.

Effect of Rainfall on Herbicide Efficacy

Required Interval	Product
15 minutes	Diquat
30 minutes	clodinafop
1 hour	Axial, Barricade II, Broadband, Bromoxynil, Bromoxynil/MCPA ester, clethodim, fenoxaprop, flucarbazone Gramoxone, Harmony SG, Infinity, Paradigm, Pixxaro, Poast Ultra, Predicade, quizalofop, thifensulfuron/tribenuron, tralkoxydim, Traxos, Tundra, Varro, Velocity m3
2 hours	2,4-D LV Ester, metsulfuron+2,4-D LV Ester, Aatrex (post-emergent applications), fluroxypyr + 2,4-D ester, MCPA Ester, Simplicity, Travallas
3 hours	dicamba/mecoprop-p/MCPA , Odyssey, Odyssey Ultra
4 hours	Accent, metsulfuron + 2,4-D Amine, 2,4-D Amine, Battalion (post-emergent application), Liberty (both), MCPA Amine, Overdrive, Permit (foliar applications), Prism, Reflex, Tandem, Ultim
6 hours	Blazer, quinclorac, Curtail M, glyphosate/dicamba, imazamethabenz, MCPA-K, MCPA Sodium Salt, Muster, Option, Prestige XC, Metribuzin, Tordon 22K, Triton C
8 hours	Basagran, CleanStart
No specific recommendation*	2,4-DB, Aim, Altitude FX/FX 2, Amitrol 240, Ares, Bromoxynil/2,4-D ester, dicamba, dichlorprop/2,4-D, DyVel, DyVel DSp, Escort, Express FX, florasulam/fluroxypyr + MCPA, florasulam + 2,4-D, florasulam + Curtail M, florasulam + glyphosate, florasulam + MCPA, fluroxypyr+MCPA, glyphosate, Grazon, Harmony K, imazethapyr, Korrex, Linuron, Lontrel, MCPB/ MCPA, mecoprop-p, Momentum, Optica Trio, Pinnacle, Pulsar, Reclaim, Restore, Salute, Solo, Tensile, tribenuron, tribenuron/metsulfuron, Triton K, Viper ADV

* The products listed make no specific time recommendation on the label. The required rainfree period could be up to 8 hours. See the product page in the guide or consult the product label.

Note: The term "Rainfastness" refers to the time needed between application and rainfall to avoid significant reduction in efficacy. Rainfall shortly after application of most post-emergent herbicides may reduce weed control. Effect will vary with product, the interval between spraying and rainfall and the intensity and duration of the rainfall. These guidelines are based on label information. Use the longest time interval on the component products when considering tank mixes.

Products Available as Prepackaged Tank Mixes

Product Name (Manufacturer)	Component 1 or A	Component 2 or B	Component 3 or C	Crops	Weeds Controlled	Area Treated per Package	
						Acres	Ha
Authority Charge (FMC)	Aim	Authority		Chickpea, field pea, flax, soybean, sunflower	See component products	80 to 64	32 to 26
Axial iPak (Syngenta)	Axial BIA	Infinity		Spring wheat (NOT including durum), barley	See component products	40	16
Black Hawk (Nufarm)	Aim	2,4-D 700 ester		Prior to seeding: Wheat (spring, durum, winter), barley, rye	See component products	80	32
Conquer (Nufarm)	Aim	Bromoxynil (Koril)		Prior to seeding canola	Weeds controlled by component products plus: Volunteer canola,	80	32
Eclipse III (Dow AgroSciences)	Lontrel (Eclipse A)	glyphosate (Eclipse III B)		Glyphosate tolerant canola varieties	See component products	40	16
Enforcer MSU (Nufarm)	Enforcer M	Thifensulfuron/ tribenuron (Boost)		Barley, Wheat (spring, durum)	Weed controlled by component products plus suppression of narrow-leaved hawk's-beard	40	16
Express FX (E. I. DuPont)	Tribenuron (Express SG)	Dicamba 480 (Dupont Dicamba)	(must be mixed with glyphosate – purchased separately)	Prior to seeding	Weeds controlled by Express SG plus glyphosate plus Group 2 & 9 resistant kochia	80	32
Harmony SG (E. I. duPont)	thifensulfuron/ tribenuron (Refine SG)	clodinafop (Harmony Grass)	Score (adjuvant)	Spring wheat (including durum)	Weeds controlled by Refine SG plus wild oat, green foxtail	40	16
Harmony K (E. I. duPont)	Refine SG (thifensulfuron/ tribenuron)	Harmony Grass (clodinafop) plus Score (adjuvant)	dicamba	Spring wheat (NOT including durum)	Weeds controlled by Refine SG plus wild oat, green foxtail & Group 2 resistant kochia	40	16
Ko-Act (Nufarm)	tribenuron (Spike)	2,4-D 700 ester		Wheat, barley, rye	See component products	80	32
Odyssey Ultra (BASF)	Odyssey	Poast Ultra	Merge (adjuvant)	Field peas, CLEARFIELD lentil	See component products	40	16
Predicade (E. I. duPont)	Barricade II (Predicade Broadleaf)	Varro (Predicade Grass)	MCPA 600 Ester	Wheat (spring, durum, winter)	See component products	40	16
Refine M (E. I. duPont), Broadside (Loveland)	thifensulfuron/ tribenuron (Refine SG)	MCPA Ester		Wheat (durum, spring, winter), barley, oat	See component products	80	32

Continued on the next page 78.

Retain SG (Loveland)	thifensulfuron/ tribenuron (Refine SG)	Fluroxypyr + 2,4-D		Wheat (spring, durum) barley	Weeds Controlled by Refine SG plus non-Group 2 resistant cleavers	40	16
Salute (Dow)	Ares	Lontrel Dry		CLEARFIELD canola	Weeds controlled by Ares plus Canada thistle, Sow-thistle (annual, perennial)	40	16
Tensile (BASF)	Solo	Lontrel Dry		CLEARFIELD canola	See component products	40	16
TraxosTwo (Syngenta)	Traxos	OcTTain (fluroxypyr+ 2,4-D)		Wheat (spring, durum)	See component products	20	8
Triton K (E. I. duPont)	Tribenuron (Express SG)	2,4-D LV Ester	Dicamba (Banvel II)	Spring wheat, barley	See component products	40	16

__Note:__ See the component products listed for information concerning staging, application information, safety precautions, the effect of weather and grazing, re-cropping, harvest interval and storage precautions.

The more stringent recommendation of the two products should be followed. Mix products in the order listed.

Herbicide Product Pages

2,4-D

Herbicide Group
4 - 2,4-D
(Refer to page 45)

Company and Formulation:

	PCP # (Product Name)	
	*600 Amine**	*700 Ester***
AgriStar	31332	29979
IPCO	17511	27819
Loveland Products Canada	5931, 29248	27818 (Salvo), 29006
Nufarm Agriculture	14726	27820
Farmers of North America		30460 (MPower 2,4-D)

* formulated as a solution.
** formulated as an emulsifiable concentrate.

600 Amine: 564 g ae per L present as dimethylamine salt and formulated as a solution.

700 Ester: 660 g ae per L present as 2 ethylhexyl ester and formulated as an emulsifiable concentrate.

Crops, Rates and Staging:

Application rates for individual products may vary from those listed. Refer to the label for product specific use rates. Rates greater than those listed may cause crop injury.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Post-emergent:

CROP	MAXIMUM SAFE RATE (G AE/ACRE)	STAGE
Wheat, barley, spring rye	227 to 283** (Esters) 227 (Amines)	4 leaf to early flag leaf.
Fall rye, winter wheat*	213 (Esters) 205 (Amines)	In spring, apply after winter cereals begin grow but before emergence of the flag leaf. From full tillering to prior to flag leaf stage.
Corn*	227 (Amines) 213 (Esters)	Apply as an overall spray before corn is 6 inches (15 cm) tall and before the 6 leaf stage. After 6 inches (15 cm) use a directed spray. Avoid making applications under hot/humid conditions onto corn.
Seedling and established grasses for forage and seed production*	213 (Esters and Amines)	Apply from the 3 leaf stage to emergence of the flag leaf of seedling grasses. For established grasses for seed production, apply in spring up to emergence of the flag leaf.
Established forage grass *(not for seed production)**	426 (Esters and Amines)	Apply in spring up to emergence of the flag leaf of established grasses, or in the fall after harvest.
Established grass pastures	907 (Esters and Amines)	No restrictions, apply when weeds are actively growing. For control of brush species, apply at time of rapid growth (usually May to mid June, and September prior to colour change).
Turf*	510 (Esters and Amines)	Apply in spring and early September on established turf. Do not use on bent grasses, or newly seeded stands.

* Note: Registered for use only with certain brands of 2,4-D; use of non-registered products is at the risk of the user.

** Note: rates above 227 g ae per acre can result in crop injury. This injury is typically offset by the benefits of improved weed control.

Pre-plant or Pre-emergent:
Barley, rye, wheat (spring, winter): Apply 134 to 213 g ea per acre (weeds less than 8 cm), to a maximum of 294 g ae per acre (weeds greater than 8 cm), of Nufarm 2,4-D Ester 700 only prior to seeding or after seeding but prior to emergence of the crop.

Soybean: Apply from 134 to 213 g ae per acre of 2,4-D 700 Ester (Nufarm and Loveland Salvo only) 7 days prior to seeding.

RATE PER ACRE*		FORMULATION	
(g ae)	(oz. ae)	600 g/L	700 g/L
113	4	201 mL	172 mL
125	4.4	222 mL	189 mL
134	4.75	225 mL	202 mL
170	6	301 mL	258 mL
205	7.25	364 mL	311 mL
213	7.5	377 mL	322 mL
227	8	402 mL	344 mL
283	10	503 mL	430 mL
340	12	603 mL	515 mL
483	17	854 mL	730 mL
510	18	905 mL	773 mL
907	32	1608 mL	1374 mL

* Actual product rates vary somewhat between products for similar uses. Check the product labels for the specific use rate for the product selected.

Weeds, Rates and Staging:

Apply at lower rates when weeds are small (2 to 4 leaf stage) and actively growing. Higher rates are needed when weeds are larger, in heavy populations, or growing under stressful conditions (excessively cold, hot, dry or wet).

For pre-seed or pre-emergent application of NuFarm 2,4-D 700 Ester only, apply 134 to 213 g ae per acre to control weeds less than 8 cm tall or 294 g ae per acre before the emergence of cereals to control weeds greater than 8 cm tall or harder to control weeds.

Note: The rates listed differ slightly from product to product. Check individual product labels for exact use rates.

Susceptible Weeds:
125 to 227 g ae per acre

Bluebur
Burdock
Cocklebur
False flax
Flixweed (late fall application or spring seedlings)
Goat's beard
Kochia
Lamb's-quarters
Mustards (except dog and tansy mustard)
Narrow-leaved hawk's-beard (fall application to seedlings or spring application at 1-2 leaf stage)
Plantain
Prickly lettuce
Ragweed (common, false and giant)
Russian pigweed
Russian thistle
Shepherd's-purse**
Stinging nettle
Stinkweed**
Sweet clover
Thyme-leaved spurge
Volunteer canola (including all herbicide tolerant varieties)
Wild radish
Wild sunflower

Harder to control weeds:
227 to 340 g ae per acre

Annual sow-thistle
Blue lettuce*
Burdock (top growth only of bolting plants)
Canada thistle***
Common chickweed
Common groundsel**
Common peppergrass
Dandelion*
Flixweed (spring prior to bolting)
Knotweed
Lady's-thumb
Leafy spurge*
Mustard (dog & tansy)
Narrow-leaved hawk's-beard (spring prior to bolting)
Oak-leaved goosefoot
Pineappleweed
Prostrate pigweed
Purslane
Redroot pigweed
Russian thistle
Sheep sorrel
Tumble pigweed

Top Growth Control only (at rates for harder to control weeds):

Biennial wormwood
Bull thistle
Buttercup
Curled dock
Field bindweed
Gumweed
Hedge bindweed
Hoary cress
Horsetail
Mouse-eared chickweed
Perennial sow-thistle
Russian knapweed
Tartary buckwheat
Volunteer sunflower

* Control of seedlings at rates given above and top growth control only of established plants.

** Spring seedlings. Winter annual weeds - apply in late fall or early spring prior to bolting.

*** Suppression only - Apply when Canada thistle plants are actively growing and have 6 to 8 inches (15 to 20 cm) of new growth. Regrowth will be present the following spring and in-crop treatments will be required.

Formulation Characteristics:

Formulation	Risk of Vapour Drift	Activity on Weeds	Risk of Crop Injury
LV Ester	Medium	Fast	Medium
Amine	Very Low	Medium	Low

Application Information:

Water Volume: Minimum 20 L per acre - ground application. Water rates depend on product and use. Consult label for details.

Higher application volumes (40 L/acre or greater), reduce the risk of crop injury.

Nozzles and Pressure: 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with ***ASABE* coarse** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Best weed control occurs when temperatures are above 21°C (daytime) or 10°C (nighttime) and humidity is above 70 percent. DO NOT apply if temperature exceeds 27°C.

Tank Mixes:

None listed on *2,4-D* label.

Restrictions:

Rainfall: ***2,4-D amine:*** within 4 hours will reduce control. ***2,4-D LV ester:*** within 2 hours will reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours

Grazing: DO NOT permit lactating dairy animals to graze fields within 7 days of application. Do not harvest forage or cut for hay within 30 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Re-cropping: No recropping guidelines are provided on the labels. As a general guideline, there should be no cropping restrictions the year following an in-crop treatment.

Aerial Application: Some formulations may be applied by air. Check the label for detailed instructions.

Storage: *2,4-D LV ester* may be frozen. *2,4-D amine* requires heated storage.

Buffer Zones:

Crop	Application method	Buffer Zones (metres[†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Field Crops	Ground*	1	0	0
	Fixed wing aircraft	10	0	45
	Helicopter	10	0	40
Fallow, pastures, rangeland	Ground*	1	1	2
	Fixed wing aircraft	15	0	60
	Helicopter	15	0	50
Turf	Ground only*	1	0	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using** shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot **treatments are exempt from buffer zone requirements.**

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.
Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Warning - Poison

Danger Poison – **Ester 700 Formulations**

For an explanation of the symbols used here see page 11.

2,4-DB

Herbicide Group
4 - 2,4-DB
(Refer to page 45)

Company:

IPCO (*Cobutox 625*- PCP#27911)
Nufarm Agriculture (*Embutox*- PCP#27912)
Loveland Products Canada (*Caliber 625* - PCP#27910)

Formulation:

625 g/L 2,4-DB formulated as an emulsifiable concentrate.

Container size - 10 L.

Crops and Staging:

NOTE - When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

CROP	STAGE
Seedling alfalfa, bird's-foot trefoil*	1 to 4 trifoliate leaf stage
Clover (alsike**, red**, white, Dutch but NOT sweet clover)*	As soon as possible after emergence of the 1st trifoliate leaf
Wheat, barley or oats	5 leaf to emergence of the flag leaf
Field corn	15 inches (38 cm) to prior to tassling using drop nozzles.
Pastures containing forage legumes	After cutting or grazing and regrowth less than 3 inches (7.5 cm)

* With or without a cereal cover crop.
** Alsike and red clovers may be damaged by 2,4-DB applications.

Seedling Forage Grasses*:

Apply from 2 to 4 leaf stage of:

Bromegrass (smooth)
Fescue (creeping red, meadow, tall)
Orchard grass
Timothy
Wheatgrass (crested, intermediate, streambank, tall)

* Not for seed production. Not for feeding in the establishment year.

Weeds and Staging:

Weeds controlled at the 0.71 L per acre rate from the 2 to 4 leaf stage at lower recommended rates include:

Lamb's-quarters
Mustard (ball, wild, wormseed)
Ragweed
Redroot pigweed
Shepherd's-purse
Stinkweed

Weeds controlled at higher recommended rates (0.91 to 1.1 L/acre) include:

WEED	STAGE
Bull thistle	Rosette to early bud stage
Canada thistle*	6 in. (15 cm) to early bud
Chicory	Rosette
Curled dock**	Young and actively growing
Dandelion*	Prior to bud
Field bindweed*	Late summer
Horsetail*	4 to 5 inches (10 to 13 cm)
Narrow-leaved hawk's-beard	Apply at rosette stage after alfalfa has gone dormant
Oak-leaved goosefoot	Up to 2 leaf stage
Perennial sow-thistle*	Rosette
Plantain	Prior to flowering
Smartweed (green, lady's-thumb)**	Seedlings
Wild buckwheat	Up to 2 leaf stage
Wild Radish	Up to 2 leaf stage
Yellow rocket	Late September to mid-October

* Top growth control
** Suppression

Refer to individual product labels for details on application rates to use for different weed species.

Rates:

CROPS	RATE (L/ACRE)	ACRES TREATED PER CONTAINER
Cereals, seedling forage legumes and grasses	0.71 to 0.91	14.1 to 11.0
Corn and pastures containing forage legumes	0.71 to 1.11	14.1 to 9.0

Application Information:

Water Volume: 61 to 81 L per acre.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with a minimum of fine droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Severe damage to legumes can occur if high temperatures (more than 27°C) or high humidity prevail at the time of application. DO NOT apply under dry soil/drought conditions.

Tank Mixes:

Herbicides:
Underseeded Legumes: *MCPA* amine (28 mL/acre*)
* 500 g/L formulation

This tank mix may increase crop damage (stunting).

Follow all precautions and restrictions on both product labels.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on 2,4-DB labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Not specified on the label. A period of up to 8 hours may be required. Contact the manufacturer for more details.

Grazing: DO NOT graze or cut treated crops or forage until 30 days after application.

Re-cropping: No restrictions the year after application.

Aerial Application: DO NOT apply by air

Storage: May be frozen.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Caution - Poison

For an explanation of the symbols used here see page 11.

AAtrex Liquid

Herbicide Group
5 - atrazine
(Refer to page 45)

Company:

Syngenta Canada (PCP#18450)

Formulations:

480 g/L atrazine formulated as a liquid suspension.

Container sizes - 2 x 10 L

Crops, Rates and Staging:

Corn (silage, field, sweet): 0.85 to 1.25 L per acre* using the following application methods:

Pre-plant incorporated (PPI).

Pre-emergent surface (after planting but before emergence of weeds and crop): Recommended only on irrigated fields. Inconsistent weed control will occur if 0.5 inches (1.25 cm) of water/precipitation does not occur within 7 days of application.

Post-emergence: 1 to 6 leaf stage and when corn is less than 12 inches (30 cm) tall. Add 1.11 to 2.23 L per acre of oil concentrate or 6.88 L per acre crop oil. Crop injury may occur when *Aatrex* and oil is applied post-emergence during cold weather.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

* Use the low rate on crops grown on sandy soils, and where weed infestations are light.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Weeds and Staging:

For pre-plant incorporated, pre-emergent and post-emergent (when weeds are less than 4 inches or 10 cm tall) control of the following weeds:

- Common purslane
- Lamb's-quarters
- Ragweed
- Redroot pigweed
- Smartweed (including lady's-thumb)
- Volunteer clover
- Wild buckwheat
- Wild mustard
- Wild oats
- Wormseed mustard

Application Information:

Water Volume: Minimum 61 L per acre.

Nozzles and Pressure: 30 to 45 psi (200 to 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Post-emergent applications made during periods of cold weather may cause crop lightening. Hot, dry weather preceding post-emergent applications may result in reduced weed control. *Aatrex* will move with soil if eroded.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

Pre-Emergent and Pre Plant Incorporated:

Dual II Magnum (0.5 to 0.71 L/acre)

Post-Emergent*:

Dicamba (*Banvel II* only - 0.24 L/acre)†

Bromoxynil/MCPA (*Buctril M* only)**

Dual II Magnum

Bromoxynil (*Pardner only*)

† DO NOT use in sweet corn.

* DO NOT use oils or adjuvants with post-emergent tank mixes.

** DO NOT treat after the 6 leaf stage, crop injury may occur.

Fertilizers: For pre-emergence applications, nitrogen solutions or complete liquid fertilizers may replace all or part of the water as a carrier. *AAtrex* may be impregnated onto dry granular fertilizers. DO NOT impregnate onto nitrate, super-phosphate or limestone.

DO NOT apply Aatrex with nitrogen fertilizer after corn has emerged, as crop injury will occur.

Insecticides: None registered.

Note: The above mixes are those listed on the Aatrex label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. See the general guidelines for mixing pesticides for more information.

Restrictions:

Rainfall: Within 2 hours of post-emergence applications may result in reduced weed control.

Grazing: DO NOT graze or cut for feed before ear emergence.

Preharvest: Leave at least 45 days from application to harvest for sweet corn and 60 days for field corn.

Re-cropping: All crops, except corn and triazine tolerant canola, may be affected the year following the use of atrazine. Flax, peas and fababeans have some tolerance to atrazine residues and are usually not affected by rates of up to 0.9 L per acre applied the previous year. Other more sensitive crops may be affected 2 or more growing seasons after application.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	10	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT mix or load within 30 m of any wells, lakes, streams, ponds, dugouts or sinkholes.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16. Let solution stand for several hours. Scrub inside surfaces but do not enter tank. Flush sprayer system with water.

DO NOT clean equipment upslope of water bodies or ditches, near cropland or shelterbelts. Clean your sprayer away from areas where family members or others are likely to frequent or walk.

Hazard Rating:

▽ Caution – Eye Irritant

KEEP OUT OF REACH OF CHILDREN.

Harmful if swallowed.

For an explanation of the symbols used here see page 11.

Accent*

Herbicide Group
2 - nicosulfuron
(Refer to page 45)

Company:

E. I. duPont Canada (PCP#25116)

Formulation:

75% nicosulfuron formulated as a water dispersible granule.

Container size 133.6 g (4 x 33.4 g water soluble bags per pouch).

Crops and Staging:*

Field Corn: 1 to 8 leaf stage (six visible collars), coleoptile (short, blunt leaf) is counted as the first leaf.

Sweet corn **: 1 to 6 leaf stage (4 visible collars).

* *NOTE Since applications to field and sweet corn in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to corn is at the risk of the user.***

** *Note that Accent is registered for use on all sweet corn varieties but tolerance may vary depending on variety. Krispy King, Jubilee and Jubilee Supersweet are the only varieties that have been tested for tolerance in western Canada. Test on small areas planted to other varieties for tolerance prior to widespread use.*

Weeds and Staging:

WEEDS	STAGING
Barnyard grass, green foxtail, yellow foxtail*, old witchgrass	1 to 6 leaves (up to 2 tillers)
Quackgrass	3 to 6 leaves (with extended leaf 4 to 8 inches (10 to 20 cm) long)
Wild oats	3 to 6 leaves

* Suppression only

The best control and yield response is achieved by applying at the earlier end of the leaf stage ranges.

Rates:

13.5 g per acre. Add non-ionic surfactant (Citowett Plus, Agsurf or Agral 90) at 0.2 L per 100 L of spray solution.

One water soluble bag will treat 2.5 acres (1 ha).

One pouch will treat 10 acres (4 ha).

Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 40 L per acre; optimum 56 to 77 L per acre.

Nozzles and Pressure: 25 to 40 psi (175 to 275 kPa) when using conventional flat fan nozzles tilted forward at a 45° angle. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Poor weed control or crop injury may result if at the time of application, plants are under stress from disease, insect or nematode injury, carryover of herbicide from a previous years application, abnormally hot or cold weather, drought, water-soaked soils, hail damage or frost. Delay application until stress passes and both corn and weeds have resumed growth. When corn is injured by frost, wait 48 to 72 hours after normal growing conditions have resumed before applying *Accent*. Stress conditions after application may also result in injury or poor weed control.

Tank Mixes:

Herbicides:

Field corn only:

Banvel II (0.24 L / acre) plus surfactant.

Pardner (0.4 L / acre) plus surfactant.

Fertilizers: Do not mix with fertilizers.

Insecticides: None registered. Accent *should not be applied to corn that has been treated with organophosphate insecticides. Leave 7 days between the application of Accent and that of a foliar organophosphate insecticide.*

Fungicides: None registered.

Note: The above mixes are those listed on the *Accent* label only.

Restrictions:

Rainfall: Within 2 to 4 hours of application may result in reduced weed control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated crops or cut for hay.

Preharvest: Leave at least 30 days in field corn and 40 days in sweet corn from application to harvest.

Re-cropping: Winter wheat may be seeded 4 months following *Accent* application. Alfalfa, barley, canola, field corn, red clover, sorghum, soybean, white bean may be seeded 10 months following application. For all other crops a field bioassay is recommended before planting. For all other crops, a field bioassay is recommended before planting.

Aerial Application: DO NOT apply by air.

Storage: Store product in original containers in a secure, dry area, away from other pesticides, food or feed.

Buffer Zones:

Application method	**Buffer Zones (metres†)** Required for the Protection of Terrestrial habitat
Ground only*	2

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Leave a 5 m buffer between the last spray path and wood lots or shelterbelts. Leave a 22 m buffer before wetland areas or water bodies.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

▽ **Caution – Eye Irritant**

KEEP OUT OF REACH OF CHILDREN.

Avoid breathing spray mist.

Avoid contact with skin, eyes and clothing.

For an explanation of the symbols used here see page 11.

Aim

Herbicide Group
14 - carfentrazone
(Refer to page 45)

Company:

FMC of Canada (PCP#28573)
Distributed by NuFarm Agriculture.

Formulations:

240 g / L carfentrazone formulated as an emulsifiable concentrate.

Container sizes - 0.6 L, 1.2 L, 3.38 L

Crops, Rates and Staging:

Pre-Seeding:

From 14.8 to 29.5 mL per acre prior to the seeding of:

Sorghum

From 14.6 to 46.8 mL per acre prior to the seeding of:

Barley
Buckwheat
Canola (rapeseed)
Chickpea
Corn (field and sweet)
Dry bean
Field peas
Flax
Lentil
Millet (pearl and proso)
Mustard
Oats
Rye
Safflower
Soybean
Sunflower
Triticale
Wheat (including spring, winter and durum)

Use *Agral 90* or *Ag-Surf* at 0.25 L per 100 L of spray solution or use *Merge* at 1 L per 100 L of spray solution.

Harvest aid treatment*:

CROP	RATE (mL per acre)
Barley, oats, wheat, millet, dry bean, chickpea, fababean, field pea, soybean, triticale	29 to 47
Sorghum	29
Potato**	94 to 142

Use *Agral 90* or *Ag-Surf* at 0.25 L per 100 L of spray solution or use *Merge* at 1 L per 100 L of spray solution.

* DO NOT apply to crops if grown for seed purpose.

** A second application of 94 to 123 mL per acre may be applied in potato.

Weeds, Rates and Staging:

Apply to listed weeds up to ten (10) cm in height unless otherwise indicated:

WEEDS	RATE (mL per acre)
Redroot pigweed	14.6
Above weeds plus: Lamb's-quarters, Round-leaved mallow, Hairy nightshade, Stinkweed, Pigweed (Prostrate, Smooth, Tumble), Purslane, Tansy mustard, Tall waterhemp	23.2
Above weeds plus: Cocklebur, Kochia, Volunteer canola (all varieties), Eastern black nightshade,	29.2
Above weeds plus: Prickly lettuce, Corn spurry	46.8

Application Information:

Water Volume: Use a minimum of 40 L per acre. Higher spray volumes is required for dense weed stands. Weed control improves with the amount of coverage.

Nozzles and Pressure: Maximum 35 psi (210 kPa) if using conventional nozzles. Low drift nozzles may require higher pressure for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity. Under warm moist conditions, herbicide symptoms may be accelerated. While under very dry conditions, the expression of herbicide symptoms may be reduced as weeds hardened off by drought are less susceptible.

Tank Mixes:

Herbicides:

Pre-plant:

*Glyphosate** (180 to 360 g ae per acre)

2,4-D Ester (213 g ae per acre) (fallow only)

Bromoxynil (57 g active ingredient per acre)

Bromoxynil + glyphosate (rates above)

Harvest aid treatment:

Barley, chickpea, dry beans, fababean, field pea, millet, oats, sorghum, and wheat:
*Glyphosate** (360 g ae per acre)

Potato only:
*Reglone***(0.7 to 0.9 L/acre)

* IPA or K salt only.

** If this mix is applied, neither the mix, nor the individual products may be applied following the first application of the mix.

Note: The above mixes are those listed on the *Aim* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall within 6 to 8 hours after application may reduce activity. Heavy rainfall shortly after application may reduce activity.

Re-entry: DO NOT enter treated fields for 12 hours.

Preharvest Interval: Leave 7 days between application and harvest for potatoes and 3 days for all other registered crops for harvest aid uses.

Grazing: DO NOT graze the treated crop or cut for feed.

Re-cropping: There are no rotational restrictions on crops registered for pre-seed use. All other crops may be planted 12 months after application.

Aerial application: DO NOT apply by air.

Storage: Store in a cool, dry place and avoid excess heat.

Buffer Zones:

Application method	Buffer Zones (metres) Required for the Protection of Terrestrial Habitat
Ground only*	5

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches above the crop canopy.

DO NOT apply in areas where surface water from the treated area can run off into aquatic habitats.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

▽ Caution – Eye and skin irritant

For an explanation of the symbols used here see page 11.

Altitude FX

Herbicide Group

2 - imazamox
4 - fluroxypyr & MCPA
(Refer to page 45)

Company:

BASF Canada

Formulations:

***Altitude FX* contains 3 separate components. Each case contains:**

***AC 299,263 120 AS* (PCP#26705):** 120 g/L imazamox formulated as a solution.
Container size - 1.34 L

***Starane* (PCP#24815):** 180 g/L of fluroxypyr formulated as an emulsifiable concentrate.
Container size - 4.8 L.

***MCPA ester 600* (PCP#27802):** 600 g/L of MCPA ester formulated as an emulsifiable concentrate.
Container size - 7.5 L.

Crops and Staging:

CLEARFIELD wheat varieties: 3 leaf (after appearance of first tiller) to 6 leaf stage to ensure optimal crop tolerance. Apply only to CLEARFIELD wheat varieties; application to any other variety of wheat or any other crop will result in crop death.

Weeds and Staging:

Grasses:

Apply from 1 to 4 leaf stage, up to a maximum of two tillers.

Barnyard grass
Foxtail (green and yellow)
Japanese brome*
Persian darnel
Volunteer cereals (barley, canary seed, oat, non-CLEARFIELD spring wheat, durum)
Wild oat

Broadleaves:

Apply up to 4 leaf stage unless otherwise indicated.

Annual sunflower
Burdock common
Chickweed
Cleavers (1 to 4 whorls)
Cocklebur
Common ragweed
Cow cockle
Flixweed
Green smartweed
Hemp-nettle (2 to 6 leaf)
Kochia
Lamb's-quarters
Mustards (except dog and tansy)
Prickly lettuce
Redroot pigweed
Round-leaved mallow*
Russian thistle*
Shepherd's-purse
Stinkweed
Stork's-bill (1 to 8 leaf)*
Vetch
Volunteer canola (all varieties)
Volunteer flax (1 to 12 cm)
Wild buckwheat
Wild radish

* Supression

Rates:

Altitude FX (1 case treats 20 acres)

AC 299,263 120 AS: 67 mL per acre.

Starane: 0. 24 L per acre.

MCPA 600 Ester: 0.38 L per acre.

Add a non-ionic surfactant (such as *Agral 90* or *Ag-Surf*) at 0.25 L per 100 L of spray solution. Surfactant not included.

DO NOT apply *Altitude FX* or other products containing imazamox, fluroxypyr or MCPA more than once per season.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 20 to 40 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE*** **coarse** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury will occur as a result of spray overlap. AVOID SPRAYER OVERLAP.

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

None Registered.

Restrictions:

Rainfall: No rainfast period is specified on the label: required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze the treated crop within 14 days of application or cut for hay within 42 days of application.

Preharvest Interval: DO NOT apply within 79 days of harvest.

Re-cropping: Winter wheat may be seeded 3 months after application. Barley, canola (all varieties), field peas, flax, lentils, oats, sunflower, and spring wheat may be grown safely the year following application. Condiment mustard may be grown the second season following *Altitude FX* application. Conduct a field bioassay the year before growing any other crop than those listed above.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Store in a cool, dry place above 5°C. Combustible - DO NOT store near heat or open flame.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

Starane

Danger - Poison

Warning - **Eye Irritant**

Caution - Skin Irritant

MCPA ester

Warning - Poison

For an explanation of the symbols used here see page 11.

Altitude FX2

Herbicide Group

2 - imazamox
4 - fluroxypyr
(Refer to page 45)

Company:

BASF Canada

Formulations:

Altitude FX2 contains 2 separate components. Each case contains:

AC 299,263 120 AS **(PCP#26705):** 120 g/L imazamox formulated as a solution.
Container size - 2.68 L

Starane **(PCP#24815): 180 g/L of fluroxypyr formulated as** an emulsifiable concentrate.
Container size - 9.6 L.

MCPA, 2,4-D, or *Curtail M* must be added and are purchased separately.

Crops and Staging:

CLEARFIELD wheat varieties: 3 leaf (after appearance of first tiller) to 6 leaf stage to ensure optimal crop tolerance. Apply only to CLEARFIELD wheat varieties; application to any other variety of wheat or any other crop will result in crop death.

Weeds and Staging:

Grasses:
Apply from 1 to 4 leaf stage to a maximum of two tillers.

Barnyard grass
Foxtail (green and yellow)
Japanese brome*
Persian darnel
Volunteer cereals (barley, canary seed, oat, non-**CLEARFIELD spring** wheat, durum)
Wild oat

Broadleaves:
Apply up to 4 leaf stage unless otherwise indicated.

Cleavers (1 to 4 whorls)
Cow cockle
Green smartweed
Kochia
Lamb's-quarters
Redroot pigweed
Round-leaved mallow*
Russian thistle*
Shepherd's purse
Stinkweed
Stork's-bill (1 to 8 leaf)*
Volunteer canola (except Clearfield varieties)
Volunteer flax (1 to 12 cm)
Wild buckwheat
Wild mustard

* **Supression**

Rates:

Altitude FX2 (1 case treats 40 acres)

AC 299,263 120 AS: 67 mL per acre.

Starane: 0. 24 L per acre.

Altitude FX2 must be tank mixed with one of the registered tank mix options found under the "tank mix" section below. Add a non-ionic surfactant (such as *Agral 90* or *Ag-Surf II*) at 0.25 L per 100 L of spray solution. Surfactant not included.

DO NOT apply *Altitude FX2* or other products containing imazamox, or fluroxypyr more than once per season.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 20 to 40 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE*** **coarse** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Initial crop injury may be observed after application but this is outgrown and should not affect yield. Severe crop injury will occur as a result of spray overlap. AVOID SPRAYER OVERLAP.

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:

Altitude FX2 ***must be mixed with one of the following:***

MCPA Ester 600 (0.38 L/acre)
2,4-D Ester (213 g ae/acre)
Curtail M (0.61 to 0. 81 L/acre)

Restrictions:

Rainfall: No rainfast period is specified on the label: required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze the treated crop within 14 days of application or cut for hay within 42 days of application.

Preharvest Interval: DO NOT apply within 79 days of harvest.

Re-cropping: Winter wheat may be seeded 3 months after application. Barley, canola (all varieties), field peas, flax, lentils, oats, and spring wheat may be grown safely the year following application. Condiment mustard may be grown the second season following *Altitude FX2* application. Conduct a field bioassay the year before growing any other crop than those listed above.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Store in a cool, dry place above 5°C. Combustible - DO NOT store near heat or open flame.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

Starane

☠ Danger - Poison

◇ Warning - Eye Irritant

▽ Caution - Skin Irritant

For an explanation of the symbols used here see page 11.

Amitrol 240*

Herbicide Group
11 - amitrole
(Refer to page 45)

*** Note: This product is no longer manufactured but inventories still remain in distribution. This product may be removed from future editions.**

Company:

Nufarm Agriculture (PCP#25684)

Formulation:

231 g / L amitrole formulated as a liquid.
Container size - 10, 450 L.

Crops, Rates and Staging:

Fall Stubble: Perennial weed control prior to spring seeding. No planting restrictions for barley, canola*, field corn, field pea, soybean, wheat, or white bean, but leave 8 months between application and the seeding of any other crops.

Alfalfa stand renovation/removal: 4 to 6 inches (10 to 15 cm) high.

Pastures (spot treatment only): For non-selective patch treatment of dandelion, Canada thistle, perennial sow-thistle, hoary cress, milkweed, poison ivy and toadflax apply 0.165 L in 25 L of water to treat a 10 m x 10 m area. For treatment of leafy spurge and horsetail, apply 0.460 L in 25 L of water to treat a 10 m x 10 m area. DO NOT mow treated plants for 3 weeks after application.

Established shelterbelts: up to 11.3 L per acre - Keep spray away from tree foliage or trunks.

Pre-seeding:

CROP	RATE (L per acre)	Delay seeding after application
Barley, wheat, canola	1.7	0 to 1 days
Field pea	1.7	5 to 7 days
Soybean (low rate)	1.7	6 days
Soybean (high rates)	5.1 to 6.7	10 to 14 days
Field corn, white bean, soybean	3.3 to 6.7	10 to 14 days

Adhere to the maximum pre-seeding rates and delays between application and seeding indicated above to avoid the risk of damage to the emerging crop or excess residues in the grain.

Avoid using rates higher than 6.7 L per acre for preplant applications prior to soybeans, dry beans and corn on very light textured soils with low organic matter, as crop damage can occur.

Fallow areas: Apply according to weed stage and rates in the next section.

Weeds, Rates and Staging:

Fall stubble: Canada thistle, perennial sow-thistle - Spray when thistle has 4 to 6 inches (10 to 15 cm) of new growth. DO NOT cultivate for 2 weeks after application. DO NOT apply after October 1. DO NOT replant crops in treated areas within 8 months of application except those registered for pre-seeding uses.

Pre-seeding: Dandelion and annual weeds Apply 1.7 L per acre to actively growing weeds less than 10 cm tall or across. DO NOT cultivate for 10 to 14 days after treatment.

Fallow, Pastures and Shelterbelts:

WEED	RATE (L/ACRE)	WEED STAGE
Canada thistle	5.1 to 6.7	Early bud to bloom stage.
Cattails	15.2 to 18.5	After seed heads have formed.
Dandelion	1.7 to 5.1	Young and actively growing plants.
Hoary cress	7.6 to 11.3	Advanced rosette and bud stage.
Horsetail	5.0 to 6.7	Actively growing plants.
Leafy spurge	15.2 to 18.5	Advanced flowering to early seed set.
Milkweed	7.6 to 11.3	Early summer after majority of shoot emergence.
Perennial sow-thistle	5.1 to 6.7	Early bud to bloom stage.
Poison ivy	3.7	Fully developed green foliage.
Quackgrass	5.1 to 6.7	When plants are 4 to 6 inches (10 to 15 cm) high and actively growing.
Toadflax	7.6 to 11.3	Advanced rosette to prebud.

Application Information:

Water Volume:
Fall stubble: 20 to 81 L per acre.
Pastures, shelterbelts: 40 to 121 L per acre. For poison ivy, apply 202 to 405 L per acre.
Pre-seeding: 20 to 81 L per acre.

Nozzles and Pressure: Maximum 45 psi (less than 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver proper coverage with ***ASABE* coarse** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Less than acceptable results may occur in dry weather.

Tank Mixes:

Nufarm supports the following mixes that are not on the Amitrol 240 label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: *glyphosate*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT re-enter treated areas for 12 hours.

Grazing: DO NOT graze treated crops or weeds or use for hay or feed.

Re-cropping: DO NOT plant any crop for 8 months following application except those registered for pre-seeding uses.

Aerial Application: DO NOT apply by air.

Storage: DO NOT store where temperatures may exceed 50°C or near open flames. Do not store below 4°C.

Buffer Zones: DO NOT contaminate any body of water. Use cautions to prevent spray, spray mist, or vapours from drifting off target. Spray drift may cause damage to crops or vegetation.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

▼ Caution – Poison

◇ Warning – Eye Irritant

For an explanation of the symbols used here see page 11.

Ares

Herbicide Group

2 - imazamox & imazapyr
(Refer to page 45)

Company:

BASF Canada (PCP#30188)

Formulations:

33 g/L imazamox and 15 g/L imazapyr formulated as a solution.

Container size - 1 x 9.8 L jug, *Merge* 8.1 L jug.

Crops and Staging:

CLEARFIELD canola: 2 to 7 leaf stage.
CLEARFIELD lentil: 1 to 9 node stage.
CLEARFIELD oilseed mustard *(Brassica juncea)*: 2 to 7 leaf stage.

Weeds, Rates and Staging:

At 244 mL per acre (40 acres per case), *Ares* will control:
Grasses - From 1 to 6 true leaf stage with up to 2 tillers:

Barnyard grass
Foxtail (green and yellow)
Japanese brome*
Persian darnel
Volunteer cereals (barley, canaryseed, durum, oats and wheat - NOT including CLEARFIELD varieties)
Wild oats

* Spring germinating Japanese brome maximum 4 leaf stage.

Broadleaf Weeds - cotyledon to 4 leaf stage unless otherwise indicated:

Chickweed
Cleavers (up to 4 whorls) ***
Cow cockle
Green smartweed
Hemp-nettle
Lamb's-quarters **
Redroot pigweed
Round-leaved mallow
Russian thistle
Shepherd's purse
Stinkweed
Stork's bill
Volunteer canola (not **CLEARFIELD varieties)**
Volunteer tame mustard **(not CLEARFIELD oilseed varieties - B. juncea)**
Wild buckwheat**
Wild mustard ***

**** Cotyledon to 6 leaf stage.**

***** NOT Group 2 resistant biotypes**

Merge **adjuvant must be used at a rate of 0.5 L per 100 L of** spray solution.

DO NOT apply *Ares* more than once per year or follow *Ares* with other products containing the active ingredient imazamox (e.g. *Solo, Odyssey*) or imazapyr (*Salute*) in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: **20 to 40 L per acre.**
Nozzles and Pressure: Maximum 40 psi (275 kPa) when **using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a** combination of nozzles and pressure designed to deliver thorough, even coverage with *ASABE medium* **droplets. Use** 50 mesh or coarser filter screens.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is **adequate for rapid growth. Under cool or dry conditions,** control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:
In CLEARFIELD canola only. DO NOT apply to CLEARFIELD oilseed mustard or CLEARFIELD lentils:
Lontrel 360 **(84 mL/acre)**

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Ares* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Avoid application when heavy rain is forecast.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Preharvest Interval: DO NOT apply within 60 days of harvest of registered crops.

Re-cropping: Barley, canaryseed, chickpea, CLEARFIELD canola/oilseed B. juncea, field corn, field pea, lentil, oat, and spring wheat may be seeded the first full season after application. Non Clearfield canola, durum, flax and sunflower may be seeded the second full season after application. The company recommends that a field bio assay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place.

Environment: Avoid drift. Leave at least 11 m between the downwind edge of the boom and sensitive areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs.

Sprayer Cleaning:

Refer to page 'Method C' in the general sprayer cleaning section on 15-16.

Hazard Rating:

No specific hazards.

Authority

Herbicide Group
14 - sulfentrazone
(Refer to page 45)

Company:

FMC of Canada (PCP#29012)

Formulation:

480 g/L sulfentrazone formulated as a suspension concentrate.

Container sizes - 4 x 3.8 L jugs per case.

Crops and Staging:

Chickpeas, Field Pea, Flax, Soybean and Sunflower: Soil applied in the spring only.

Pre-plant surface: Apply to the soil surface prior to seeding the crop.

Pre-emergent surface: Apply to the soil surface up to 3 days after seeding. Crops emerging or near emerging at application may be injured.

All applications require rainfall for proper activation. (See "Effects of Growing Conditions")

DO NOT use on coarse soils classified as sand, loamy sand or sandy loam or where water table is high.

Weeds, Rates and Staging:

Controls the following weeds when applied to the soil prior to emergence:

At 88 mL per acre (172 acres per case):

Kochia

At 118 mL per acre (129 acres per case):

Cleavers (suppression only)
Lamb's-quarters
Redroot pigweed
Wild buckwheat

Use the higher rates within the rate range for soils with pH less than 7.0 and organic matter greater than 3%.

DO NOT APPLY ***Authority*** to:
- **coarse-textured (Sand, Loamy Sand, Sandy Loam) soils**
- **compacted or heavy clay soils with less than 1.5% organic matter,**
- **soils with organic matter content greater than 6%,**
- **soils with a pH of 7.8 or greater.**

Application of *Authority* in back to back years is not recommended.

Application Information:

Water Volume: Minimum 40 L per acre. Use as high water volume as practical to achieve even distribution over the soil surface.

Nozzles and Pressure: Maximum 30 psi (175 kPa) if using conventional nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE medium*** droplets or larger.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

All applications require rainfall for proper activation. If weed growth begins before activation occurs, poor control may result on larger weeds. A moderate rainfall (10 to 20 mm) or equivalent irrigation is required within 10 to 14 days to activate pre-emergent surface treatments. If rain does not occur, a shallow harrowing or use of a rotary hoe may assist activation using existing soil moisture. Dry conditions that persist after any application may reduce weed control. On sandy soils, heavy rainfall following application may cause leaching of *Authority*, resulting in reduced weed control.

Tank Mixes:

Herbicides:
Preseed to Peas:
Imazethapyr (28.3 mL/acre)

FMC of Canada supports the following tank mixes that are not on the *Authority* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides:
All crops: *Aim; Glyphosate* (180 to 360 g ae per acre)

Restrictions:

Rainfall: Rainfall following application is required for adequate weed control.

Grazing: DO NOT graze treated crops or cut for hay.

Preharvest Interval: Leave 60 days between application and harvest.

Re-entry: DO NOT re-enter treated area within 12 hours.

Re-cropping: Registered crops may be planted anytime after application. Alfalfa, barley, canola, field corn and spring, durum and winter wheat may be seeded the season following application (after one winter). Sweet corn, lentils and sorghum may be seeded the second season (two winters) after application. For all other crops three winters must pass following application and a successful bioassay indicating adequate tolerance before planting. For each year of drought experienced, add one year to the intervals above and conduct a bioassay to confirm tolerance of the rotational crop. Lentils may be particularly sensitive to *Authority* residue.

Aerial Application: DO NOT apply by air.

Storage: Store above 5°C to keep from freezing. If frozen, and solid crystals are observed, warm to above 15 °C and shake or roll container periodically to dissolve solids.

Buffer Zones: DO NOT fill mix or clean sprayer within 15 m of any water source, unless the well is properly capped or activities take place on impervious pads or properly diked mixing/loading areas. Leave a 1m buffer between the last spray path and water or wetland habitats and 10 meters to sensitive plants and upland habitats when applying by ground. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16. Leaving cleaning solution in the sprayer tank and plumbing for an extended period will improve cleaning effectiveness.

Hazard Rating:

▽ Caution - Poison.

For an explanation of the symbols used here see page 11.

Authority Charge

Herbicide Group
14 - carfentrazone & sulfentrazone
(Refer to page 45)

This product is a co-pack of *Aim* (page 87) and *Authority* (page 95). Information is restricted to Crop, Weeds, Rates and Tank Mixes. For other detailed information on the component products see the product pages listed above. *Note: this product is based on an unlabeled tank mix supported by the manufacturer.*

Company:

FMC Canada

Formulation:

***Aim* (PCP#28573):** 240 g/L cafentrazone formulated as an emulsifiable concentrate.
Container size – 1 x 1.2 L

***Authority* (PCP#29012):** 480 g/L sulfentrazone formulated as a suspension concentrate.
Container size – 2 x 3.79 L

Crops and Staging:

Chickpea, Field Pea, Flax, Soybean and Sunflower:

Soil applied in the spring only, tank mixed with glyphosate.

Pre plant surface: Apply to the soil surface prior to seeding the crop.

Weeds and Staging:

Weeds controlled by component products.

Rates

Aim: 15 to 18.75 mL per acre.

Authority: 88 to 118 mL per acre.

One case treats 80 to 64 acres at the respective rates above.

Tank Mixes:

Authority Charge should be tank mixed with glyphosate at 180 to 360 grams ae per acre (See glyphosate page for equivalent product rates.) based on the *Aim* component label only.

For additional information, precautions and restrictions see the individual component at the page numbers shown above.

Avadex Brands

Herbicide Group
8 - triallate
(Refer to page 45)

Company:

Gowan Canada

Formulation:

***Extra Strength Avadex BW* (PCP#16759):** 480 g/L triallate formulated as an emulsifiable concentrate.

Container size 2 x 10 L, 115 L, 946 L.

***Avadex MinTill* (PCP#25112):** 10% triallate formulated as a granular. Container size 22.7 kg, 451.3 kg.

Crops, Rates and Application Timing:

***Avadex* Liquid Rates – Spring Treatment**

		RATE (L/acre)		ACRES TREATED PER 115 L CONTAINER	
		Organic Matter		Organic Matter	
CROP	APPLICATION TIMING	4% or less	Greater than 4%	4% or less	Greater than 4%
Spring and durum wheat	Before Seeding[*]	1.0	1.2	115	98
	After Seeding	1.2	1.4	98	82
Barley	Before and After Seeding	1.2	1.4	98	82
Canola, flax[†], mustard	Before Seeding	1.4	1.9	82	62
Peas (dry)	Before Seeding	1.4	1.4	82	82

[*] DO NOT apply this product before seeding wheat in soils with 4 percent or less organic matter (brown, dark brown or grey wooded soils) where discers are to be used for seeding. If an air seeder is to be used, it must be equipped with a depth control device to ensure accurate seed placement, otherwise crop injury may occur.

[†] Excluding Solin (low linolenic acid flax).

***Avadex* Granular Rates – Fall Treatment**

	RATE (KG/ACRE)			ACRES TREATED PER 451.3 KG		
	Organic Matter			Organic Matter		
CROP	Less than 2%[*]	2 to 4%	Greater than 4%	Less than 2%[*]	2 to 4%	Greater than 4%
Spring and durum wheat	4.5	5.7	6.9	101	80	66
Barley, canaryseed	4.5	5.7	6.9	101	80	66
Canola, flax[†], mustard	5.7	6.9	8.9	80	66	51

[*] Fall treatments conducted under minimum tillage are not recommended on soils with less than 2 percent organic matter.

[†] Excluding Solin (low linolenic acid flax).

***Avadex* Granular Rates – Spring Treatment**

		RATE (KG/ACRE)		ACRES TREATED PER 451.3 KG CONTAINER	
		Organic Matter		Organic Matter	
CROP	APPLICATION TIMING[**]	4% or less[*]	Greater than 4%	4% or less[*]	Greater than 4%
Spring and durum wheat	Before seeding[***]	4.5	5.7	101	80
	After seeding	5.7	6.9	80	66
Barley, canaryseed	Before and after seeding (barley only)	5.7	6.9	80	66
Canola, flax[†], mustard	Before seeding	6.9	8.9	66	51

[*] Minimum tillage treatments must be applied to fields with at least 2 percent organic matter.

[**] Minimum tillage treatments must be applied 10 to 14 days before seeding or incorporating. For minimum tillage treat

ments on spring and durum wheat, apply 5.7 kg per acre on soils with 4% organic matter or less and 6.9 kg per acre on soils with greater than 4 percent organic matter.

*** DO NOT apply this product before seeding wheat in soils with 4% or less organic matter (brown, dark brown or grey **wooded soils) where discers are to be used for seeding. If an air seeder is to be used, it must be equipped with a depth** control device to ensure accurate seed placement, otherwise crop injury may occur.

† **Excluding Solin (low linolenic acid flax).**

Seedling Forage Legumes (under-seeded only):

Apply recommended rates for the companion crop.
Alfalfa
Bird's-foot trefoil
Clover (alsike, red, sweet)

Weeds and Staging:

For pre-emergent control of wild oats.

Application Information:

Water Volume (Liquid formulations only):
45 L per acre.

Pressure: 30 psi (200 kPa), **liquid formulation only.**

Nozzles: Flat fan, liquid formulation only. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets.

General Information: The liquid formulation must be incorporated into soil that is free of lumps or crop residue. **The liquid formulation is recommended for spring use because soils are left in an erosion prone state if the liquid is** fall-applied. The granular formulation may be incorporated into fields with crop residues and is best suited for fall use.

Fall Application (Minimum Tillage): Applications of *Avadex* granules should be made to standing stubble or chemical fallow fields that are not prone to erosion. DO NOT apply to smooth, hard packed soils that may allow granules to drift. If excessive crop residue exists at the time of application, harrowing should be conducted to ensure the granules are in good contact with the soil. Apply when the soil begins to cool (less than 4°C) and within 3 weeks of soil freeze-up. Incorporation can be performed in the spring before seeding or as part of the seeding operation.

Fall Applications (Conventional Tillage): Apply *Avadex* granules to fields that are in good working condition, without excessive crop residue. Heavy crop residue or lumpy, wet **fields may require tillage prior to application.** *Avadex* must be applied after October 1 but before soil freeze-up. Application before October 1 may result in reduced weed control. Only **one incorporation is required in the fall. The second incor**poration may be done in the fall (before soil freeze-up) or in the spring.

Spring Application (Minimum Tillage): *Avadex* granules should be applied in spring and when the soil temperature is 4°C or less. Apply granules 10 to 14 days before incorporation. DO NOT apply more than 4 weeks before seeding is intended.

Spring Application (Conventional Tillage): Apply *Avadex* **(liquid or granules) to fields that are in good working con**dition, without excessive crop residue. Heavy crop residue **or lumpy, wet fields may require tillage prior to application. Liquid formulations should be applied to fields with** 30 percent or less residue cover. *Avadex* may be applied before or after seeding of wheat, barley, or canaryseed and before **seeding of canola, flax, mustard or peas (liquid only). If** wheat is being seeded into soils with an organic matter content of less than 4 percent, *Avadex* should be applied after seeding.

Incorporation:

Minimum Tillage: Incorporation of *Avadex* granules in minimum tillage systems is achieved with one high disturbance incorporation, which can be conducted prior to seeding, or as part of the seeding pass. A high disturbance system is one that disturbs the soil enough so that emerged weeds are controlled by the operation (example - air seeder with cultivator shovels). Harrowing after the incorporation operation is recommended for best results.

For optimum results in minimum tillage systems, incorporate when wild oat growth is noticeable in the field, as this will ensure that the soil is warm enough for activation of *Avadex*.

Under excessively warm or wet conditions between application and crop emergence, control may be reduced. For best results on heavy wild oat infestations, use the conventional tillage guidelines for incorporation.

Conventional Tillage: *Avadex* **applications require two** incorporations, with the second incorporation at right **angles to the first. Using a seeder that provides soil disturbance equivalent to a cultivator may replace one of** the incorporations. The first incorporation of the granular formulation should be completed within 48 hours of application and the second incorporation should be delayed an additional 48 hours or more. The first incorporation of the **liquid formulation should be completed as soon as possible** after spraying, while the second incorporation may be done any time prior to crop emergence.

Incorporate to a depth of 2 inches (5 cm) by setting disc or cultivator implements to cut 3 inches (7.5 cm) into the soil. Mixing the product to greater depths will dilute the herbicide, decrease wild oat control, and may cause injury to **cereals. Ensure that cereals are seeded below the treated layer** (2 to 3 inches or 5 to 7.5 cm). Incorporations performed after seeding should be conducted with harrows or other suit**able tillage equipment adjusted so as not to disturb the seed.** Harrowing does not provide effective incorporation if compact soil prevents penetration of harrow teeth, if crop residue accumulates in the harrow sections, or if the harrows bounce.

Fallow: Incorporation can be done by a disc followed by harrowing at right angles, a vibrashank cultivator followed by harrowing at right angles, or double harrowing. The second operation can be delayed until spring. If fallow must be ridged to prevent soil erosion the granular formulation should not be used in the fall. Note that fall minimum tillage applied granules do not require incorporation in the fall. If soils must be ridged following application of the liquid formulation, ridging depth should be kept to a minimum as deep ridging may reduce wild oat control and increase crop injury.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Reduced control may result if prolonged cool conditions or dry soil conditions prevail at the time weeds are emerging. If conditions are dry or wild oats germinate from below the treated zone, the weeds may emerge, but will usually be controlled. Thinning of wheat can occur under conditions of heavy rainfall or if cold soil conditions persist as the crop emerges.

DO NOT apply to fields where crop residue has been burned in the previous 12 months. Efficacy will be reduced.

Tank Mixes:

Herbicides: *Avadex* liquid may be tank mixed with liquid formulations of trifluralin for control of wild oats, green and yellow foxtail in wheat and barley. Apply after seeding but prior to crop emergence. Consult the recommendations for trifluralin for rates in different soil types.

Insecticides: None registered.

Fertilizer: *Avadex* liquid alone, or tank mixed with liquid formulations of trifluralin, may be tank mixed with liquid fertilizer. Compatibility of the herbicide and liquid fertilizer should be checked. Follow the instructions on the herbicide label prior to adding the herbicide to the spray tank.

Avadex liquid may be sprayed on dry urea fertilizer. A minimum of 60 kg per acre (150 kg/ha) of dry urea fertilizer must be used. Only commercial blending is recommended.

Note: The above mixes are those listed on the *Avadex* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: At least 0.5 inches (1.5 cm) within 2 weeks of application is required for activation.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze the treated crop or use as hay or feed prior to crop maturity or in year of treatment.

Re-cropping: DO NOT seed tame oats the year after treatment.

Aerial Application: DO NOT apply by air (*Extra Strength Avadex BW*). Granular formulations may be applied by air with attachments designed for applying low volumes of granules (*Avadex MinTill*).

Storage: DO NOT freeze liquid formulations. Store granular formulations in a cool, dry place.

Buffer Zones: (Liquid formulations only)

Application method	Buffer Zones (metres †) Required for the Protection of:			
	Aquatic Habitats of Depths			Terrestrial habitat
	Less than 1 m	1 to 3 m	Greater than 3 m	
Ground only*	5	2	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

☠ Warning – Poison (Liquid formulation)

⚠ Warning – Contains the allergen soy (Liquid and Granular)

Skin and Eye Irritant (Granular formulation)

For an explanation of the symbols used here see page 11.

Axial BIA

Herbicide Group
1 - pinoxaden
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

Axial BIA **(PCP#30341):** 50 g/L **pinoxaden formulated as** an emulsifiable concentrate.
Container size - 2x10 L, 80 L, 400 L.

Crops and Staging:

Spring wheat (not including durum), winter wheat and **barley. Up to the emergence of the flag leaf.**

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates, and Staging:

Apply from the 1 to 6 leaf up to the emergence of the 4th tiller.
Axial BIA **at 0.48 L per acre (no adjuvant required)* (one case treats 40 acres):**

Foxtail (green and yellow)
Barnyard grass
Proso millet
Volunteer oat
Volunteer canary seed
Wild oat

Apply at the 2 to 3 leaf stage for optimum control.

Optimum weed control and yield response occurs when weeds are controlled before tillering.

Maximum one application per year of this or other products containing the active ingredient pinoxaden. Do not mix with any other adjuvant other than what is provided in the package.

Application Information:

Water Volume:

Ground: 20 to 40 L per acre.

Aerial: 12 L per acre

Nozzles and Pressure: 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury may result.

Weed control may be reduced if *Axial BIA* is applied under stress conditions such as drought, heat, insufficient fertility, flooding or prolonged cool temperatures.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:
Bromoxynil/MCPA (Buctril M and *Mextrol 450* only*)*†
Curtail M†
Florasulam + Curtail M (Spectrum only)***†
Florasulam + MCPA (Frontline XL only)
fluroxypyr + MCPA (Trophy only)†
Infinity
MCPA ester† (0.34 to 0.45 L/acre - 500 g/L form)
*Refine SG + MCPA ester****† (12 g/acre + 0.23 to 0.28 L/acre)
Thifensulfuron/tribenuron (*Refine SG* only)**

* Always consult the label of the broadleaf herbicide prior to use.
** Addition of surfactants other than those included in *Axial BIA* are not required.
*** Suppression only of green foxtail.
† A reduction in barnyard grass control may be observed.

Insecticides: None registered.

Fungicides: Propiconazole (*Tilt* only).

Fertilizers: None registered.

Note: The above mixes are those listed on the *Axial BIA* label only.

Syngenta also supports the following mixes that are not on the *Axial BIA* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Barricade II; Broadside; Enforcer M; florasulam/fluroxypyr + MCPA (Stellar* only*); Triton C; Triton C + MCPA)*††*; Momentum + MCPA ester; Paradigm; Pixxaro; Prestige XC; Pulsar; Pulsar+Express SG* (up to 6 g/ acre); *Pulsar* (low rate) *+MCPA ester.*

Fungicides: *Propiconazole* (*Propel* only*), Quilt.*

†† Only wild oat is controlled with this mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of treatment may reduce control.

Re-entry: DO NOT enter treated fields for 12 hours.

Preharvest: Leave at least 60 days between treatment and harvest of grain and straw.

Grazing: DO NOT graze livestock within 7 days or cut for hay within 30 days of application.

Re-cropping: No restrictions the year following treatment. DO NOT seed any crops in the year of treatment following application (emergency re-crop).

Aerial Application: May be applied by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of: Terrestrial habitat
Ground only*	1
Aerial by airplane or helicopter	25

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Buffers are not required for handheld and backpack applications.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

▽ Caution – Poison

◇ Warning – Eye and skin irritant

For an explanation of the symbols used here see page 11.

Axial iPak

Herbicide Group
1 - pinoxaden
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

This product is a prepackaged tank mix of *Axial BIA* (page 101) and *Infinity* (page 221). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

Company:

Syngenta Canada

Formulation:

The *Axial iPak* package contains the following:

***Axial BIA* (PCP#30341):** 50 g/L pinoxaden formulated as an emulsifiable concentrate.
Container Size - 1 x 10 L

-plus-

***Infinity* (PCP#28738):** 37.5 g/L pyrasulfotole and 210 g/L bromoxynil formulated as an emulsifiable concentrate.
Container size - 1 x 6.7 L jugs per case.

Crops and Staging:

Spring wheat (not including durum), and barley. Up to the emergence of the flag leaf.

Weeds and Staging:

Weeds controlled by the component products.

Rates:

***Axial BIA*:** 0.48 L per acre (no adjuvant required)*

-plus-

***Infinity*:** 0.33 L per acre.

One case treats 20 acres

Note: Ammonium sulphate is required to be added at 202 g per acre (99% dry) or 0.4 L per acre (49% solution) at 4 to 6 whorls for certain weeds controlled by *Infinity*

* Maximum one application of products containing the active ingredients pinoxaden, pyrasulfotole or bromoxynil per year. DO NOT mix with any other adjuvant other than what is provided in the package.

For additional information, precautions and restrictions, see the individual component at the page numbers shown above

Axial Xtreme

Herbicide Group
1 - pinoxaden
4 - fluroxypyr
(Refer to page 45)

Company:

Syngenta Canada (PCP#30391)

Formulation:

50 g/L pinoxaden and 87.5 g/L fluroxypyr formulated as an emulsifiable concentrate.

Container size - 2 x 10 L, 80 L, 400 L.

Crops and Staging:

Spring wheat (NOT including durum) and barley:

1 to 6 leaf stage prior to the emergence of the 4th tiller, and before the first node can be felt in the stem.

Weeds and Staging:

Grasses - 1 to 6 leaf prior to the emergence of the 4th tiller

Foxtail (green and yellow)
Barnyard grass
Proso millet
Volunteer oat
Volunteer canary seed
Wild oat

Broadleaf Weeds - stages indicated below:

Cleavers (up to 4 whorls)
Kochia (2 to 8 leaf)
Stork's bill (up to 6 leaf)*
Wild buckwheat (up to 4 leaf)*

* Suppression.

Rates:

0.5 L per acre.

DO NOT apply *Axial Xtreme* more than once or follow it with any other products containing pinoxaden or fluroxypyr in the same year.

Application Information:

Water Volume: 20 to 40 L per acre.

Nozzles and Pressure: Maximum 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse classification*** droplets. Use 50 mesh or coarser filter screens. Thorough coverage of the plants is essential for consistent control.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Tolerance and efficacy is best when applied during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under prolonged stress caused by excessive cool or heat, flooding or drought, or poor fertility, control of some weeds may be reduced and or crops may be injured.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:
Bromoxynil/MCPA†
Curtail M†
Florasulam + MCPA (Frontline XL only)††
Infinity††
MCPA ester (0.28 to 0.37 L/acre – 600 g/L form)†
Thifensulfuron/tribenuron (Refine SG only)
Thifensulfuron/tribenuron (Refine SG only) + *MCPA* ester (rates above)†

† A reduction in barnyard grass control may be observed with this mix.

†† A reduction in green foxtail control may be observed with this mix.

Fungicides: *Propiconazole* (*Tilt* only at 101 to 202 mL/acre)

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Axial Xtreme* label only.

Syngenta also supports the following mixes that are not on the *Axial Xtreme* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Broadside*

Fungicide: *Tebuconazole* (*Fuse* only), *Quilt*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Preharvest: DO NOT apply within 60 days of harvest.

Grazing: Must not be grazed within 7 days or cut for livestock feed within 30 days of treatment.

Re-cropping: Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye or wheat may be seeded the first full season after application or fields can be fallowed.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. DO NOT freeze.

Environment: Avoid drift. Leave at least 15 m between the downwind edge of the boom and sensitive areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs. Buffer zones can be reduced by 70% when using shrouds or by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method B' on page 15. Use 500 g or mL per 100L of rinsate for alkali detergents or 250 g or mL per 100L of rinsate for concentrated laundry detergents. DO NOT use chlorine based cleaners.

Hazard Rating:

⚠ Warning – Eye and skin irritant

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Barricade II

Company:

E. I. duPont Canada

Formulation:

The *Barricade II* package contains two components:

Barricade SG **(PCP#29544):** 25% thifensulfuron methyl plus 25% tribenuron methyl formulated as a water soluble granule.

Container size - 486 g bottle.

-plus-

Perimeter II **(PCP#30094):** 333 g a.e./L fluroxypyr formulated as an emulsifiable concentrate.

Container size - 3.4 L

Crops and Staging:

Barley and spring wheat (including durum) only: 2 leaf until first node can be felt at the base of the stem.

Winter wheat: In the spring from the 3 tiller stage until the emergence of the flag leaf.

Herbicide Group

2 - thifensulfuron & tribenuron
4 - fluroxypyr
(Refer to page 45)

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Weeds Controlled:

Annual smartweed (green, lady's thumb)
Canada thistle (less than 6 inches (15 cm) tall or across and prior to budding)**
Cleavers (1 to 6 whorls)
Common chickweed (1 to 6 leaf)
Cow cockle
Flixweed
Hemp-nettle
Kochia
Lamb's-quarters
Narrow-leaved hawk's-beard
Night-flowering catchfly
Redroot pigweed
Round-leaved mallow (1 to 5 leaf)
Russian thistle
Sow-thistle (perennial)
Stinkweed
Stork's-bill (1 to 6 leaf)
Volunteer canola (not CLEARFIELD varieties)
Wild buckwheat
Wild mustard
Volunteer flax (up to 12 cm)

** Suppression only.

Rate:

Barricade SG: 12 g per acre.

plus

Perimeter II: 85 mL per acre.

(one package treats 40 acres)

Maximum of one application of this or other thifensulfuron/tribenuron products or fluroxypyr products per year.

Add *Agral 90, Agsurf II,* or *Citowett Plus* at 0.2 L per 100 L of spray solution. *Barricade SG* may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:
Ground: Minimum 40 L per acre.
Aerial: 12 to 20 L/acre

Nozzles and Pressure: Flat fan nozzles are recommended. Sprayers without drift reduction nozzles should use between 30 to 40 psi (210 to 275 kPa). Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets by ground or ***ASABE coarse*** droplets by air. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to registered crops that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

Tank Mixes:

Herbicides: None registered

Fertilizers: None registered.

E.I. duPont supports the following mixes that are not on the *Barricade II* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Horizon NG, Axial BIA, Assert, Flucarbazone, Flucarbazone 2.0 + 2,4-D Ester, MCPA ester* (190 mL/acre), *Puma Advance, Simplicity, Traxos, Varro.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Up to 1 inch within 1 hour of application may reduce control.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Preharvest Interval: Leave 60 days between application and harvest.

Grazing: MUST NOT be grazed or fed to livestock for 7 days after treatment.

Re-cropping: Alfalfa, barley, corn, canola, dry beans, flax, forage grasses, lentils, mustard, oats, peas, potatoes, rye, soybeans, sugar beets, sunflowers, wheat or fields can be fallowed the year after treatment.

Aerial Application: May be applied by aircraft.

Storage: Store in a cool, dry place. Avoid freezing. If frozen, bring to room temperature and agitate before use. This product is COMBUSTIBLE. DO NOT store near heat or open flame.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	15	15	15
Fixed wing aircraft	5	0	125
Helicopter	3	0	100

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Follow the sprayer cleaning instructions on the *thifensulfuron/tribenuron* page. The addition of a wetting agent (detergent) will also aid the cleaning process.

Refer to page 15 to 16 for additional information.

Hazard Rating:

☠ Danger – Poison

⚠ Warning – Contains the allergens milk and sulfites

For an explanation of the symbols used here see page 11.

Basagran Brands

Herbicide Group

6 - bentazon

(Refer to page 45)

Company:

BASF Canada

Basagran (PCP#12221)
Basagran Forté (PCP#22006)

Formulation:

480 g / L bentazon formulated as a solution in both products. *Basagran Forté* has a built-in adjuvant.

Container size -

Basagran: 2 x 9 L jugs.
Basagran Forté: 2 x 10 L jugs.

Crops and Staging:

***Basagran* and *Basagran Forté*:**

CROP	STAGE
Soybean	No restrictions
Dry bean ***	After the first trifoliate leaf
Corn	No restrictions
Pea	After 3 leaf pairs but prior to flowering
Fababean	At least 4 inches (10 cm) tall
Flax	After 2 inches (5 cm) in height

***Basagran Forté* only:**

CROP	STAGE
Forage millet and forage sorghum (forage **and seed production)***	3 to 6 leaf prior to canopy closure
Established clover (alsike, red) for seed **production only***	7.5 to 25 cm prior to canopy closure

***Basagran* only:**

CROP	STAGE
Spring wheat (excluding **durum)****	No restrictions (limited to the 4 leaf to flag leaf by 2,4-D staging)
Solin (low linolenic acid flax)	After 2 inches (5 cm) in height
Forage grasses for seed production*: Bromegrass, creeping red fescue, crested wheatgrass, meadow foxtail, orchardgrass, timothy.	1 to 7 leaf stage
Forage legumes (seedlings) for seed production*: Alfalfa, alsike clover, red clover, sainfoin.	After the third trifoliate leaf
Established alfalfa for seed production.	Prior to flowering
Established clover (Sweet, or Red) and sainfoin for seed production.	3 to 10 inches (7.5 to 25 cm) high

* **One application per season.**

** ***Basagran* only at 0.4 L per acre. Must be tank mixed with 2,4-D (no adjuvant required).**

*** **Refer to product labels for a list of dry bean types** registered for *Basagran*. *Basagran Forté* registered for all dry bean types but not tested for tolerance on all types. Test a small area of a new variety for tolerance before widespread use.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Add *Assist* or *XA* oil concentrate at 0.4 to 0.8 L per acre to *Basagran* only. *Basagran Forté* does not require the addition of *Assist* or *XA* oil concentrate. If hot, humid conditions prevail (above 28°C and 80% relative humidity), use only the low rate of *Assist* or *XA* oil concentrate. *Citowett Plus* may be used on peas at 0.25 L per 100 L spray mixture. Ammonium sulphate can be added to Basagran and Basagran Forté for applications to soybean and to Basagran only for applications to dry beans. Apply the rate listed when weeds in the table are within the recommended height:

ANNUAL WEEDS	0.71 L per acre		0.91 L per acre	
	Inches	Maximum Leaf Stage	Inches	Maximum Leaf Stage
Buttercup			2 to 4	6*
Cleavers			1 to 3 whorl stage	
Cocklebur	3 to 7	6*	7 to 12	10*
Common chickweed			1 to 3 weeks after emergence	
Common groundsel			2 to 4	
Common ragweed			1 to 2	6
Corn spurry			1 to 4	
Flower of an hour	1 to 2	6*	2 to 4	10*
Giant ragweed			2 to 6	4
Hairy galinsoga			2 to 3	6*
Hairy nightshade			0.2 to 0.8	6
Jimsonweed			2 to 6	10
Lady's-thumb (smartweed)	1 to 3	6*	3 to 8	10
Lamb's-quarters			0.5 to 1.0	8
Purslane			1 to 2	6
Redroot pigweed (suppression only)			0.5 to 1.5	4
Russian thistle (suppression only*)			1 to 3	4*
Shepherd's-purse	Rosette to 4	6*	4 to 10	6
Stinkweed	Rosette to 2	6*	2 to 6	6
Stork's-bill			1.5 to 4	2 to 6 leaf stage
Volunteer canola	0.75 to 6	8**	0.75 to 6	8
Wild mustard	1 to 5	6*	5 to 10	10
Wild radish			1 to 2	6
PERENNIAL WEEDS	Repeat application 7 to 15 days after first application (if necessary)			
Canada thistle	6 to 8			
Field bindweed	1 to 2.5			
Yellow nutsedge	6 to 8			

* *Basagran Forté* only.

** *Basagran* only.

Basagran may be applied in wheat at 0.4 L per acre when tank mixed with *2,4-D* amine or ester at 143 to 190 g ae to control the weeds controlled by *2,4-D* plus lady's-thumb, redroot pigweed and daisy fleabane. No adjuvant is required for this mix.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 to 160 L per acre. A minimum of 80 L per acre is recommended for optimum control.*

Nozzles and Pressure: Maintain 40 to 60 psi (275 to 425 kPa)* when using conventional flat fan nozzles capable of delivering high water volumes with ***ASABE medium*** droplets. Low drift nozzles may require higher pressures for proper performance. Contact the herbicide manufacturer regarding the suitability of low drift nozzles for use with this product. Direct nozzles 45° forward to improve contact with vertical targets.

* Higher water volumes and pressures should be used when the weeds are at the upper end of their recommended treatment stage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Poor results will occur if temperatures are cool. Optimum results are achieved when applied at daytime temperatures between 20 and 28°C. Applications at temperatures greater than 28°C may result in crop injury.

Tank Mixes:

Herbicides:

In soybean:
Pinnacle (2.2 to 3.2 g / acre)

In dry bean:
**Basagran* only (0.71 L / acre) plus *Reflex* (0.23 L / acre) plus *Agral 90*.

***In spring wheat** (not including durum):*
Basagran only (0.4 L / acre) must be tank mixed with *2,4-D amine* or *ester* at 143 to 190 g ae / acre. This tank mix DOES NOT need any adjuvant.

* For use in the Red River Valley of Manitoba only.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers:

In soybean:
Basagran or *Basagran Forté* (0.71 to 0.91 L / acre) plus UAN (4 L / acre)

DO NOT add fertilizer with *Assist* or *XA Oil Concentrate* when tank mixing with *Pinnacle*.

The risk of crop injury increases with the use of fertilizer mixes under hot, humid conditions.

Use of fertilizer mixes is not recommended for use under western Canadian environmental conditions for other crops.

When mixing *Basagran Liquid* or *Basagran Forté* refer to the tank mix partner label for any additional restrictions and precautions.

Allow 4 days between application of *Basagran* and other herbicides, fertilizers or insecticides.

Note: The above mixes are those listed on the *Basagran/ Basagran Forté* labels only. Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 to 8 hours will reduce control.

Re-Entry: DO NOT enter treated field for 12 hours.

Grazing: Allow 30 days between treatment with *Basagran Forté* and harvest of forage sorghum and millet for hay. Otherwise DO NOT graze treated crops or cut for feed prior to crop maturity.

Preharvest Interval: 50 days for *Basagran* + *2,4-D* in wheat, 84 days for *Basagran* + *Reflex* in Dry beans in Manitoba. Other uses are restricted only by appropriate staging.

Re-cropping: No restrictions the year after application.

Aerial Application: May be applied by air for weed control **in dry beans or soybeans only. Use 23 to 45 L / acre** water volume. *Assist* or *XA Oil Concentrate* **at 0.05 to 0.1 L / acre must** be added. DO NOT use *Assist* or *XA Oil Concentrate* in excess of **0.1 L / acre as substantial crop injury could occur.** DO NOT apply fertilizer mixes in soybean or *2,4-D* tank mix in wheat by air. Crop canopy should NOT cover the weeds.

Storage: May be frozen.

Buffer Zones:

Application method	Crop	Buffer Zones (metres††) **Required for the** Protection of: Terrestrial habitat
Ground†	Sorghum**, Forage millet**, Forage grasses and legumes, Pea*	1
	Corn, Dry bean, Fababean, Flax, Pea**, Soybean, Spring wheat*	2
Fixed wing airplane*	Dry bean	20
	Soybean	35
Helicopter*	Dry bean	20
	Soybean	30

See page 36 for an explanation of the different habitats.

* *Basagran* only

** *Basagran Forté* only

† **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

†† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on page 15-16.

Hazard Rating:

Basagran

▽ Caution - Poison

Basagran Forté

◇ Warning - Poison

⯃ Danger – Corrosive to Eyes

◇ Warning – contains the allergen soy.

For an explanation of the symbols used here see page 11.

Battalion*

*** (For use only on field corn grown in the Red River Valley region of Manitoba)**

Herbicide Group

2 - rimsulfuron
4 - dicamba
15 - metolachlor
(Refer to page 45)

Company:

E. I. duPont Canada

Formulation:

The *Battalion* package contains the following:

Elim EP **(PCP#23518):** 25% rimsulfuron formulated as a water dispersible granule.

Container sizes - 480 grams (8 x 60 gram soluble bags).

Dual II Magnum **(PCP#25729):** 915 g/L s-metolachlor formulated as an emulsifiable concentrate.

Container sizes - 6 L.

Banvel II **(PCP#23957):** 480 g/L dicamba formulated as a solution of a diglycolamine salt.

Container sizes - 6 L.

Crops and Staging:*

May be applied to field corn as a pre-emergent or post-emergent application. For use in the Red River Valley region of Manitoba only. DO NOT use on sweet corn.

Pre-emergent – apply as a broadcast ground treatment after planting but before weeds and corn emerge.

Post-emergent – apply up to the 3-leaf stage (2 visible collars or 20 cm in height - leaf extended). Corn hybrid sensitivity to post-emergent applications of *Battalion* have been observed in the field with varieties rated less than 2500 CHU in regions with less than 2500 CHU. Check with seed supplier prior to applying *Battalion* to ensure the hybrid has known tolerance to Group 2 and Group 4 herbicides.

* ***NOTE*** *- Since applications to Corn in the Red River Valley region of Manitoba has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance or crop safety.* ***Application to corn is at the risk of the user.***

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Weeds and Staging:

Pre-emergent applications:**

- Common ragweed
- Eastern black nightshade
- Green foxtail
- Lady's-thumb
- Lamb's-quarters
- Quackgrass (suppression)
- Redroot pigweed
- Yellow foxtail (suppression)

** Rain is required within 10 days of application or a shallow cultivation or use of a rotary hoe is required.

Post-emergent applications: Apply prior to the 2 leaf stage of the following weeds. *Battalion* must be applied with a non-ionic surfactant (see **'Rates'** for details)

- Annual smartweeds (green, lady's-thumb)
- Barnyard grass
- Cleavers
- Common ragweed
- Corn spurry
- Cow cockle
- Eastern black nightshade
- False ragweed
- Foxtail (Green and Yellow)
- Giant ragweed
- Hare's-ear mustard
- Indian mustard
- Lamb's-quarters
- Quackgrass (suppression)
- Redroot pigweed
- Russian pigweed
- Tartary buckwheat
- Tumble mustard
- Velvetleaf
- Wild buckwheat
- Wild mustard
- Wormseed mustard

Rates:

	Rate per acre	
	Application timing	
Component	Pre-emergent	Post-emergent
Elim EP	24 g	20 g
Dual II Magnum	300 mL	250 mL
Banvel II	300 mL	250 mL
Acres per case	20	24

* *Battalion* must be applied with a non-ionic surfactant such as *Citowett Plus, Agral 90* or *Agsurf II* at a rate of 0.2 L per 100 L of spray solution (0.2 % v/v) when applied as a post emergent application to corn.

Application Information:

Water Volume: 60 to 70 L per acre.

Nozzles and Pressure: Flat fan nozzles are recommended. Sprayers without drift reduction nozzles should use a maximum of 40 psi (275 kPa). Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE*** **medium droplets**. Use a 50 mesh or coarser screen and filter system

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Rapid fluctuations in temperature (greater than 20°C difference within 24 to 36 hours) will stress the corn crop. For maximum crop safety, allow 48 to 72 hours for the corn to acclimatize before applying *Battalion*.

Apply ONLY when the temperature in the 24 hours before AND after application is between 10°C and 25°C. Temperatures beyond this range increase the potential for crop injury. Separate applications of *Battalion* herbicide followed by a broadleaf herbicide (minimum of 12 hours later) will reduce the potential for injury.

WARNING: Crop injury may result if application is made to corn that has been stressed by abnormally hot, humid, or cold weather conditions, frost, low fertility, drought, water saturated soil, compacted soil, previous pesticide applications, disease, or insect damage. If corn has been injured by frost, wait 48 to 72 hours before applying *Battalion*.

Tank Mixes: None registered

NOTE: *Battalion* should **NOT** be applied to corn that has been treated with *Lorsban*. Leave 7 days between the application of *Battalion* and that of a foliar organophosphate insecticide.

Note: The above mixes are those listed on the *Battalion* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. See the general guidelines for mixing pesticides on page 14 for more information.

Restrictions:

Rainfall:

Pre-emergent applications: Rainfall is required within 10 days of application for proper activation of *Battalion*. Otherwise a shallow cultivation or use of a rotary hoe is required.

Post-emergent applications: Within 4 hours of application may result in reduced weed control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated crops or cut for feed.

Preharvest Interval: Leave at least 80 days from application to harvest.

Re-cropping: Corn, winter wheat and barley may be seeded the year following *Battalion* application. For all other crops, a field bioassay is recommended before planting.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT mix or load within 30 m of any water sources.

Sprayer Cleaning:

Refer to product label for complete sprayer cleaning instructions. DO NOT **clean equipment upslope of water bodies or** ditches, near cropland or shelterbelts. Clean your sprayer away from areas where family members or others are likely **to frequent or walk.**

For additional information, Refer to page 15.

Hazard Rating:

Caution – Poison (Banvel II)

Warning – Eye Irritant

Keep out of reach of children

For an explanation of the symbols used here see page 11.

BlackHawk

Herbicide Group

4 - 2,4-D
14 - carfentrazone
(Refer to page 45)

This product is a prepackaged tank mix of *Aim* (page 87) and 2,4-D (page 79). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Nufarm Agriculture

Formulation:

The *BlackHawk* package contains the following components:
***Aim EC* (PCP#28573)**: carfentrazone-ethyl 240 g/L as emulsifiable concentrate.
Container size - 2x 600 mL
***2,4-D 700 ester* (PCP#27820)**: 2,4-D 660g/L as emulsifiable concentrate
Container size - 2x 8.69 L.

Crops and Staging:

Pre-seed burndown prior to seeding the following crops:

Spring wheat
Durum wheat
Winter wheat
Barley
Rye
Chemfallow

Soybean – 7 days prior to seeding.

Weeds and Staging:

Aim EC: 15 mL / acre + ***2,4-D 700 ester***: 212 mL / acre.
One case treats 80 acres
Emerged weeds controlled by the component products up to 10 cm or 3 leaf rosette stage plus:

Kochia*
Volunteer canola*

* All biotypes.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:
Glyphosate (180 to 360 g ae per acre)

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Blazer

Herbicide Group
14 - acifluorfen
(Refer to page 45)

Company:

United Phosphorus Inc. (PCP#23315)

Formulation:

240 g / L acifluorfen present as a sodium salt and formulated as a solution.

Container size - 10 L jug.

Crops and Staging:

Soybean from the 1 to 3 trifoliolate leaf stage.

DO NOT apply before the first trifoliolate leaf stage of the soybean.

DO NOT apply to soybeans grown on sand or loamy sand soils.

Weeds and Staging:

***Blazer* applied at 0.5 L per acre (one jug treats 20 acres) plus *Assist* adjuvant at 0.5 L per 100 L of spray solution will control:**

WEED	MAXIMUM LEAF STAGE
Common ragweed	8
Redroot pigweed	4

***Blazer* applied at 1.0 L per acre** (one jug treats 10 acres) will control the weeds above plus the following weeds at the maximum leaf stages listed:**

WEED	MAXIMUM STAGE
Canada thistle*	Pre bud
Cocklebur	4 leaf
Common milkweed*	-
Field bindweed*	-
Hedge bindweed*	
Lamb's-quarters	2 leaf
Nightshade (eastern black)	6 leaf
Redroot pigweed	6 leaf
Smartweed (including lady's thumb)	8 leaf
Wild Mustard	10 leaf

* Topgrowth control only. The plant will grow back from underground roots

****DO NOT add Assist adjuvant with the 1.0 L per acre rate as crop injury will result.**

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: No specific water volume is provided on the label but a minimum of 81 L per acre is implied by the adjuvant rates on the label. Good coverage of weed foliage is required for proper control.

Nozzles and Pressure: Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Soybeans may exhibit speckling, bronzing and/or leaf burn. The trifoliolate leaf emerging at the time of application may be distorted. Soybeans usually outgrow these conditions and continue to grow at a normal rate with no adverse effect on vigour, maturity, or crop yield. It is important to have good spray coverage on the weeds as *Blazer* works mainly by contact action. Failure to follow the suggested application rate and timing may result in unsatisfactory control.

Tank Mixes:

Herbicides:
Blazer (0.5 L / acre) plus *Basagran Forté* (0.5 L / acre) or Blazer (0.255 L / acre) plus *Basagran** or *Basagran Forté* (0.71 L / acre) depending on predominant weed species present.

See label for details.

*Add Assist adjuvant at 0.5 L per 100 L of spray solution for *Basagran* tank mix only.

Fertilizers: None registered. DO NOT add fertilizers to the spray mixture.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Blazer* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours may reduce weed control.

Re-Entry: DO NOT enter treated fields for 12 hours.

Preharvest Interval: No specific preharvest interval is indicated on the label.

Grazing: DO NOT graze the treated crop or cut for hay.

Re-cropping: The label has no restriction on crops that may be planted the following season.

Aerial application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones: Leave a buffer of 15 m from the last spray pass and sensitive upland areas such as other crops, pastures, rangeland, woodlots or shelterbelts.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15-16. Tanks may require cleaning after several tanks to remove any excessive oil buildup on the inside of the tank.

Hazard Rating:

Warning – Poison

Danger – Corrosive to eyes.

Warning – Causes skin irritation. Avoid contact with skin. Harmful if inhaled.

For an explanation of the symbols used here see page 11.

Broadband

Herbicide Group
1 - pinoxaden
2 - florasulam
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

***Broadband* (PCP#29138):** 92.7 g/L pinoxaden and 7.7 g/L florasulam formulated as an emulsifiable concentrate.

Container size – 10.5, 84.2 L.

***Adigor* Adjuvant (PCP#28151):** 11.3, 90.4 L.

Crops and Staging:

Barley, spring wheat (NOT including durum) up to the emergence of the flag leaf.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Grass weeds controlled from 1 to 6 leaves and prior to the emergence of the 4th tiller:

Barnyard grass
Foxtail (green and yellow)
Proso (Crown) millet
Volunteer oat
Volunteer canary seed
Wild oat

Broadleaf weeds controlled at the 1 to 6 leaf stage:

Annual smartweed (including lady's-thumb)
Common chickweed
Cleavers
Hemp-nettle†
Pigweed, redroot†
Shepherd's-purse
Sow-thistle (annual, perennial**)†
Stinkweed
Volunteer canola*
Wild buckwheat
Wild mustard

† Suppression only.

* Not Clearfield varieties.

** Applications made at advanced leaf stages will reduce product effectiveness.

Rates:

Broadband: 263 mL per acre.

Add *Adigor* adjuvant at 280 mL per acre.
(Package sizes listed above will treat 40 or 320 acres)

DO NOT apply more than once per season.

Application Information:

Water Volume: 20 to 40 L per acre.

Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** **droplets. Low drift nozzles may require** higher pressures for proper performance.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Temporary crop injury may occur with tank-mixes under extreme weather conditions or when the crop is suffering **from stress due to inadequate or abnormally high moisture** levels or extreme temperatures.

Tank Mixes:

Herbicides:

Curtail M (0.6 L / acre)

MCPA LV500 ester (0.28 L / acre)

Fungicides: *Propiconazole* (*Tilt* only at label rates)

Fertilizers: None registered

Note: **The above mixes are those listed on the *Broadband* label only.**

Syngenta also supports the following mixes that are not on the *Broadband* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Fluroxypyr+MCPA* (*Trophy* only); *Infinity; Prestige XC* (low rate).

Fungicides: *Propiconazole* (*Propel* & *Tilt* only at the low rate); *Quilt; Tebuconazole* (*Fuse* only).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-Entry: DO NOT re-enter treated fields within 12 hours.

Preharvest: Leave 60 days between treatment and harvest.

Grazing: DO NOT cut for livestock feed within 30 days or grazed by livestock within 7 days of treating the crop.

Recropping: No restrictions the year following treatment.

Aerial Application: DO NOT apply by air.

Storage: Store in dry, heated storage.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	5	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

⚠ **Warning Eye Irritant**

For an explanation of the symbols used here see page 11.

Bromoxynil

Herbicide Group
6 - bromoxynil
(Refer to page 45)

Company:

Bayer CropScience (*Pardner*)
IPCO (*Brotex 240, Brotex 480*)
Nufarm Agriculture (*Koril 235*)
ADAMA Canada (*Bromotril II*)
Loveland Products Canada (*Loveland Bromax*)

Formulation:

Pardner **(PCP#18001):** 280 g/L bromoxynil formulated as an emulsifiable concentrate.
Container size - 2 x 8 L.

Koril 235 **(PCP#25341):** 235 g/L bromoxynil formulated as an emulsifiable concentrate.
Container size - 2 x 9.71 L, 120 L.

Bromotril II **(PCP#30371) &** ***Brotex 240*** **(PCP#28519):** 240 g/L bromoxynil formulated as an emulsifiable concentrate.
Container size - 2 x 9.7 L, 116.4 L (*Bromotril II* only).

Brotex 480 **(PCP#31348) &** ***Loveland Bromax*** **(PCP#31431):** 480 g/L bromoxynil formulated as an emulsifiable concentrate.
Container size - 2 x 9.7 L.

Crops, Staging and Rates:

Pardner: At 0.40 to 0.48 L per acre one 8 L jug treats 20 to 16.5 acres.

Koril, Brotex 240 & Bromotril II: At 0.49 to 0.57 L per acre one 9.71 L jug treats 20 to 17 acres.

Brotex 480 & Loveland Bromax: At 0.24 to 0.28 L per acre one 9.7 jug treats 40 to 34 acres.

See the chart below for registered crops and specific rates and stages. NR = Not Registered.

CROP	STAGE	RATE (L / acre)				
		Pardner	*Koril*	*Bromotril II*	*Brotex 240*	*Brotex 480/ Bromax*
Barley, oats, triticale, wheat (spring and durum**)	2 leaf stage to early flag	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Winter wheat	2 to 4 leaf stage (fall application) First growth to early flag leaf (spring application)	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Corn (field or sweet)	4 to 8 leaf	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Corn (field or sweet) with drop pipes	Beyond 8 leaf	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Canaryseed (seed production only)	3 to 5 leaf	0.40	0.49	0.49	0.49	0.24
Seedling alfalfa	2 to 6 trifoliate leaf stage	0.40	0.49	0.49	0.49	0.24
Established alfalfa (seed production only)	Up to 10 inches (25 cm). Apply no more than twice in one growing season.	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28
Fall rye	First growth to early flag leaf (spring application only)	0.40 to 0.48	0.49 to 0.57	0.49 to 0.57	0.49 to 0.57	0.24 to 0.28

Crops, Staging and Rates continued on next page.

Crops, Staging and Rates *continued*

CROP	STAGE	RATE (L / acre)				
		Pardner	***Koril***	***Bromotril II***	***Brotex 240***	***Brotex 480/ Bromax***
Flax and Solin (low linolenic acid flax)	2 to 4 inches (5 to 10 cm)	0.40	0.49	0.49	0.49	0.24
Forage millet and sorghum	4 leaf to 8 inches (20 cm)	0.40	NR	NR	0.49	0.24
Seedling grasses (seed production only): Brome- grass, Fescue (creeping red, meadow), Orchard grass, Reed canary grass, Russian wildrye, Timothy, Wheatgrass (crested, inter mediate, slender, tall)	2 to 4 leaf (Establishment year only)	0.40 to 0.48	NR	NR	0.49 to 0.57	0.24 to 0.28
Pearl millet and sorghum (grain)*	4 leaf to 8 inches (20 cm)	0.40	NR	NR	NR	NR
Prior to direct seeding cereal crops (mixed with glyphosate only)	Apply according to weed stage.	0.40	0.49	NR	0.49	0.24
Pre-seed / pre-plant prior to seeding canola (mixed with glyphosate only)	Apply according to weed stage	0.40 to 0.51	0.61	NR	NR	0.29***

NOTE: Since application to grain pearl millet and sorghum is registered under User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this on product grain pearl millet and sorghum do so at their own risk.*

** *Pardner* only.

*** *Brotex 480* only.

Weeds and Staging:

Weeds controlled at the 1 to 4 leaf stage:

American nightshade
Annual smartweed (green, pale, lady's-thumb)
Bluebur
Cocklebur
Common ragweed
Cow cockle*
Kochia**
Pigweed*†
Russian thistle**
Stinkweed*
Wild mustard*

Weeds controlled at the 1 to 8 leaf stage:

Common groundsel
Lamb's-quarters
Tame buckwheat
Tartary buckwheat
Wild buckwheat

* Controlled with high rate only.
** Apply before plants are 2 inches high.
† Not controlled in seedling alfalfa.

Application Information:

Water Volume:
Ground:
Corn, Millet & Sorghum: 80 to 120 L per acre.
Seedling grasses: 60 L per acre.
Other crops: 40 L per acre.
Aerial (wheat and barley only): 8 to 16 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Avoid spraying if temperatures are greater than 25°C. **Leaf** scorching may occur in corn and flax if applied during or after adverse growing conditions, such as cool and wet or hot (greater than 27°C) and humid weather.

Tank Mixes:

Herbicides:

CROP	TANK MIXES
Spring wheat	*2,4-D†, Achieve Liquid*
Winter wheat	*2,4-D, Achieve Liquid, MCPA*
Barley	*2,4-D†, Achieve Liquid, MCPA†*
Oats	*MCPA*
Fall rye, canaryseed	*MCPA**
Flax	*MCPA (amine, ester or K salt)*
Seedling forage grasses***	*MCPA*
Corn	*Accent◊ + surfactant (field corn only), Aatrex** (0.4 L per acre), Banvel II (field corn only)***
Prior to seeding: Cereals, Canola††	*Glyphosate*
Prior to seeding (Koril only)	*Aim, CleanStart*

* **The ester formulations are preferred but other formulations can be used.**

** DO NOT add oil or surfactant to this mix. DO NOT use atrazine formulations that contain oil.

*** *Bromax, Brotex 240, Brotex 480* and *Pardner* only.

† May be applied by air.

†† *Bromax 480, Koril 235* and *Pardner* only. Not all glyphosate products/formulations are registered for this use. Refer to individual product labels.

◊ *Since the use of this tank mix on corn is registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this tank mix on corn do so at their own risk.***

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the bromoxynil labels only.

***Bromoxynil* manufacturers may also support mixes with pesticides that are not on the *bromoxynil* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application will reduce control.

Re-entry: DO NOT enter treated fields for 24 hours.

Grazing: DO NOT graze treated wheat, barley, oats, forage millet, sorgum or seedling alfalfa crops or cut for feed within 30 days of application.

DO NOT graze other treated crops or cut for hay prior to crop maturity.

Re-cropping: No restrictions.

Aerial Application: Registered for aerial application on **wheat and barley. The use of low water volumes, 8 to 16 L** per acre may result in less effective weed control than seen with ground application.

Storage: May be stored at freezing temperatures.

Will return to original state by warming to room temperature (20 to 22°C) and agitating thoroughly.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	1
Fixed wing aircraft**	20	5	55
Helicopter**	20	3	45

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy

****Wheat and barley crops only.**

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

All:

Warning – Poison

Brotex 240, Bromotril II:

Warning – Eye and Skin Irritant

Koril 235:

Danger – Eye and Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Bromoxynil/2,4-D Ester

Herbicide Group
4 - 2,4-D
6 - bromoxynil
(Refer to page 45)

Company:

Bayer CropScience (*Thumper*)
IPCO (*Leader*)
ADAMA Canada (*Thrasher II*)
Nufarm Agriculture (*Approve*)

Formulation:

Thumper **(PCP#22659):** 280 g / L bromoxynil and 280 g / L 2,4-D ester formulated as an emulsifiable concentrate. Container size - 8 L.

Approve (PCP#28123), Leader (PCP#28853) & Thrasher II **(PCP#30372):** 225 g / L bromoxynil and 225 g / L 2,4-D ester formulated as an emulsifiable concentrate.
Container size - 10 L, 100 L*, 120 L**, 500 L*
* *Approve* only
** *Thrasher II* only

Crops and Staging:

Spring wheat (including durum) and barley at the 4 leaf to early flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled at the 1 to 4 leaf stage:

American nightshade
Ball mustard
Bluebur
Cocklebur
Common ragweed
Cow cockle
Flixweed
Night-flowering catchfly
Redroot pigweed
Shepherd's-purse
Smartweed (green, lady's-thumb, pale)
Volunteer canola
Volunteer sunflower

Weeds controlled at the 1 to 8 leaf stage:

Common groundsel
Lamb's-quarters
Stinkweed
Tame buckwheat (up to 4 leaf stage with *Approve*)
Tartary buckwheat
Wild buckwheat
Wild mustard

Weeds Controlled from 1 to 12 leaf (max. 2 inches tall):

Kochia
Russian thistle

Rates:

Thumper: 0.4 L per acre (one 8 L container treats 20 acres).

Approve, Leader or Thrasher: 0.5 L per acre (One 10 L container treats 20 acres).

Application Information:

Water Volume:
Ground: 20 to 40 L per acre.
Aerial: 12 to 16 L per acre. Use the higher volume when there is a heavy crop canopy, or when the majority of weeds are cow cockle, smartweed, or pigweed.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets. All strainer and nozzle screens must be 50 mesh or coarser.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Less than acceptable weed control may be expected if weeds are under stress because of excessive moisture, drought, or cool weather.

Tank Mixes:

Herbicides:
In wheat (spring, durum) and barley:
Liquid Achieve (0.2 L / acre) plus *Turbocharge* aduvant
Puma Advance (label rates)*

In wheat (spring, durum, winter):
Varro (0.48 L / acre)*

In wheat (spring, durum) only:
Clodinafop 240EC (93 to 117 mL / acre)[Δ] plus adjuvant

* *Thumper* only.

[Δ] Manufacturers may only support specific mixes. Contact the manufacturer for more information.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Bromoxynil/2,4-D Ester* labels only.

Bromoxynil/2,4-D ester **manufacturers may also support mixes with pesticides that are not on the *Bromoxynil/2,4-D ester* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval may be up to 8 hours. Contact manufac**turer for more information.

Re-Entry: DO NOT enter treated fields for at least 24 hours.

Grazing: DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals 3 days before slaughter.

Preharvest Interval: DO NOT harvest within 30 days of application.

Re-cropping: No restrictions the year after application.

Aerial Application: May be applied by air.

Storage: May be frozen. Shake well before using after being frozen.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	1
Fixed wing aircraft	20	5	55
Helicopter	20	3	45

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments **are exempt from buffer zone requirements.**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

All Products:

◈ Warning - Poison

Thumper* and *Approve

▽ Caution – Skin and Eye Irritant

Leader* and *Thrasher

◈ Warning – Skin and Eye Irritant

▽ Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Bromoxynil/MCPA ester

Herbicide Group
4 - MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Bayer CropScience (*Buctril M*)
IPCO (*Logic M*)
Nufarm Agriculture (*Mextrol 450*)
ADAMA Canada (*Badge II*)

Formulation:

***Buctril M* (PCP#18022):** 280 g/L bromoxynil and 280 g/L of MCPA ester formulated as an emulsifiable concentrate. Container size - 8 L.

***Mextrol 450* (PCP#26999), *Badge II* (PCP#30370) & *Logic M* (PCP#28109):** 225 g/L bromoxynil and 225 g/L of MCPA ester formulated as an emulsifiable concentrate. Container size - 10 L, 120 L (*Badge II* only). (*Mextrol* - 100 L, 500 L)

Crops and Staging:

Field Crops:

All Products:

CROP	STAGE
Barley, oats, spring wheat (including durum)	2 leaf to early flag
Winter wheat	2 to 4 leaf stage in the fall or after growth resumes up to early flag leaf.
Fall rye	When growth commences in spring to early flag leaf
Canaryseed	3 to 5 leaf stage
Flax and Solin (low linolenic acid flax)	2 inches (5 cm) to early bud stage. **Best tolerance occurs when flax is** 2 to 4 inches (5 to 10 cm) tall.
Corn	4 to 6 leaf stage

Seedling forage grasses†:
2 to 4 leaf stage†.

All Products:

Bromegrass
Fescue (creeping red, meadow)
Reed canarygrass
Russian wild rye
Timothy
Wheatgrass (crested, intermediate, slender, tall)

Buctril M, Logic M and Badge only:

Fescue (tall)
Meadow bromegrass
Meadow foxtail
Orchard grass
Wheatgrass (streambank)

Established Forage Grasses:

Timothy (seed† or hay††)** - prior to emergence of the flag leaf.

† Maximum of two treatments per year at least 21 days apart.

†† Maximum of two treatments per year at least 90 days apart.

Perennial Cereal Rye* (*Buctril M* only):

Established stands: 2 leaf up to early flag leaf stage.

Establishment year: 2 to 4 leaf stage in the fall, or from the time growth commences to early flag leaf stage in the spring.

* *Since the use of this tank mix on perennial cereal rye is registered under the User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this tank mix on perennial cereal rye do so at their own risk.***

** Applications onto Timothy for hay production registered with *Buctril M, Logic M,* and *Mextrol 450* only.

Weeds and Staging:

Weeds up to 4 leaf stage:

American nightshade
Annual smartweeds (green, lady's-thumb, pale)
Bluebur
Ball mustard
Cocklebur
Cow cockle
Flixweed
Kochia**
Night-flowering catchfly
Redroot pigweed*
Russian thistle**
Scentless chamomile***
Shepherd's-purse
Volunteer canola
Volunteer sunflower

* May not be controlled in flax.
** Control before plants are 2 inches tall.
*** Spring seedlings only.

Weeds up to 6 leaf stage:

Wild tomato (*Buctril M, Logic M & Badge II* only)

Weeds up to 8 leaf stage:

Common groundsel
Common ragweed
Lamb's-quarters
Stinkweed
Tame buckwheat
Tartary buckwheat
Wild buckwheat
Wild mustard
Wormseed mustard

Weeds suppressed in winter wheat from the 2 to 12 leaf stage:

Prickly lettuce (All except *Logic M*)

Weeds where top growth is controlled:

Canada thistle
Perennial sow-thistle

Rate:

Buctril M: 0.4 L per acre. One 8 L jug treats 20 acres.

Mextrol 450, Badge II & Logic M: 0.5 L per acre. One 10 L jug treats 20 acres.

Application Information:

Water Volume:
Corn: 80 to 120 L per acre.
Flax, Solin: 20 to 40 L per acre.
Cereals: 20 to 40 L per acre.
Seedling forage grasses: 60 L per acre.
Established timothy: 60 L per acre.
Perennial Cereal Rye: Not less than 20 L per acre.
Aerial: 8 to 16 L per acre.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets

Refer to specific labels for recommended water volumes.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Best weed control when humidity is high at the time of spraying and for the following day or two. Prolonged cool conditions may result in reduced weed control. Spraying during early morning may increase the risk of flax injury.

Avoid spraying in temperatures greater than 25°C.

DO NOT apply to flax, canaryseed or corn if daytime temperatures exceed 27°C within 48 hours before or after application.

Tank Mixes:

Herbicide Tank Mix Table:

Products listed below are at label rates for each crop. See labels for details.

CROP & TANK MIXES	Badge	Buctril M	Logic M	Mextrol 450
Flax (including Solin):				
Poast Ultra + Merge adjuvant	✓	✓	✓	✓
Clethodim + adjuvant	✓*	✓ **	✓	✓*
Spring wheat (including durum) and Barley:				
Liquid Achieve	✓	✓	✓	✓
Ally	✓	✓	✓	✓
MCPA (amine, ester & K)	✓	✓	✓	✓
Refine SG (4 g / acre) #		✓	✓	
Cordon (label rates)				✓
Puma Advance (label rates)		✓		
Puma Advance + Refine SG (rates above)		✓		
Spring wheat (including durum):				
Everest 2.0 (label rates)		✓		
Varro (0.2 L / acre)		✓		
Spring wheat only (NOT including durum):				
Axial BIA (0.48L / acre)	✓	✓		
Spring wheat only (NOT including durum) and Barley:				
Axial BIA (0.48L / acre)		✓		
Winter Wheat:				
Refine SG (4 g / acre)#			✓	
Oats:				
MCPA (amine, ester & K)	✓	✓	✓	✓
Corn:				
Aatrex	✓	✓	✓	✓

* *Select* only

** *Select* and *Centurion* only.

*** *Buctril M* only

# **Requires the addition of a surfactant as per** *Refine SG.*

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *bromoxynil/ MCPA ester* **labels only.**

Bromoxynil/MCPA **manufacturers may also support mixes with pesticides that are not on the** ***bromoxynil/ MCPA*** **labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall within 1 hour of application may reduce weed control.

Re-entry: DO NOT enter treated fields for at least 24 hours, or 15 days for corn to be harvested by hand.

Grazing: DO NOT graze treated grain or established timothy crops or cut for feed within 30 days of application. DO NOT graze meadow foxtail in the year of treatment. DO NOT graze other treated forage grasses within 56 days of treatment.

Preharvest Interval: DO NOT harvest perennial cereal rye within 30 days of application, or flax or solin within 60 days of application.

Re-cropping: No re-cropping restrictions the year after treatment.

Aerial Application: May be applied by air to wheat, barley, **and oats only. Use higher water volume (see 'Application Information'**) when the majority of weeds are cow cockle, smartweed, hemp nettle, pigweed, and Canada thistle.

Storage: May be frozen. Shake the container well when thawed to reconstitute components before use.

Buffer Zones:

Application method	Crop	Buffer Zones (metres †) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground only*	All	1	1	4
Fixed wing aircraft	Oats	15	2	60
	Barley & wheat	20	5	60
	Rye	1	0	60
Helicopter	Oats	15	1	50
	Barley & wheat	20	3	50
	Rye	1	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Badge II, Buctril M, Logic M:

◈ Warning

Mextrol 450

☠ Danger – Poison

◇ Warning – Skin Irritant
Potential Skin sensitizer

▽ Caution – Eye irritant

For an explanation of the symbols used here see page 11.

Casoron

Herbicide Group
20 - dichlobenil
(Refer to page 45)

Company:

Platform Specialty Products Canada (PCP#12533)

Formulation:

4% dichlobenil formulated as a granular.
Container size - 15 kg, 22.7 kg.

Crops:

Poplar plantations

Shelterbelts consisting of the following species:

Ash
Barberry
Birch (cutleaf-weeping)
Juniper
Lilac
Linden
Boxwood
Caragana
Cedar (White, Eastern Red)
Crabapple
Elm
Euonymus (Burning bush)
Forsythia
Honeysuckle
Locust
Maple
Mock orange
Poplar
Rose
Spirea
Willow

NOTE: DO NOT apply to shelterbelts with mugo pine, firs, hemlock, holly, spruce or other shallow rooted species or injury may result. DO NOT apply in or around greenhouses. DO NOT use on light sandy soils.

Weeds and Staging:

Apply in early spring or late fall prior to annual weed emergence, or after cultivation has removed existing weeds.

Annual blugrass
Artemisia (absinthe,* wormwood, sage)
Bindweed*
Canada thistle*
Chickweed
Dandelion*
Foxtail (green and yellow)
Groundsel
Horsetail
Knotweed
Kochia
Lamb's-quarters
Loosestrife
Mustard
Nutsedge*
Pigweed
Plantain
Purslane
Quack grass*
Sheep sorrel*
Shepherd's-purse
Smartweed
Sow-thistle
Spurge
Vetch*
Wild buckwheat*

* Controlled with fall applications at the higher rates.

Rates:

45 to 70 kg per acre.

At the low rate, a 15 kg bag will treat a 4 yd by 407 yd (4 m by 340 m) strip of shelterbelt. At the high rate, a 15 kg bag will treat a 4 yd by 256 yd (4 m by 214 m) strip of shelterbelt. If application is followed by 0.5 to 1.0 inches (1.3 to 2.5 cm) of irrigation, the lower rates are recommended.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply during periods of high soil temperatures (more than 15°C).

Tank Mixes:

None registered.

Restrictions:

Rainfall: Does not reduce activity.

Re-entry: DO NOT enter treated areas for at least 24 hours.

Grazing: DO NOT graze in treated area.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. DO NOT freeze.

Buffer Zones: Site characteristics and conditions that may lead to runoff include, but are not limited to, heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g., soils that are compacted, fine textured or low in organic matter). Avoid application of this product when heavy rain is forecast.

Equipment Cleaning:

Refer to page 15.

Hazard Rating:

No specific rating. Keep out of reach of children.

Harmful if swallowed.

Avoid skin or eye contact.

CleanStart

Herbicide Group
9 - glyphosate
14 - carfentrazone
(Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

One case of *CleanStart* contains 2 components:

***Credit* (PCP#25866):** 356 g/L glyphosate formulated as a solution.

Container size - 2 x 10 or 450 L.

***Aim* (PCP#28573):** 240 g/L carfentrazone formulated as an emulsifiable concentrate.

Container size - 1 x 600 mL or 4 x 3.38 L.

Crops and Staging:

Prior to the seeding of most crops* including the following:

- Barley
- Beans, dry
- Buckwheat
- Canola
- Chickpea
- Corn
- Fababean
- Flax
- Lentil
- Millet (pearl and proso)
- Mustard
- Oats
- Peas, field
- Potato*
- Rye
- Safflower
- Sorghum
- Soybean
- Sunflower
- Triticale
- Wheat

*Note – before using any pesticide on potatoes, consult the list of "*Agricultural Pesticides Approved for Use*", available from Simplot Canada and McCain Foods (Canada).

Harvest Aid Treatment:
CleanStart may be applied to the following crops when seed is at less than 30% moisture to speed the rate of dry-down of the following crops and green weedy material. See glyphosate preharvest uses for additional staging information.

CROP*	RATE		
	Credit (glyphosate) (g ae/acre)†	Aim (mL/acre)	Acres per case
Barley, chickpea, dry bean, field pea, oats, wheat,	360†**	30	20

* DO NOT apply to crops if grown for seed purpose.
† See the glyphosate page for equivalent product rates.

Weeds, Rates and Staging (Pre-seeding):

Credit* 0.5 to 1.0 L per acre plus *Aim* at 15 to 30 mL per acre (40 to 20 acres per case or 900 to 450 acre bulk): *Weeds controlled by glyphosate at the above rates plus rapid burnoff of:

- Chickweed
- Dandelion (spring seedlings only)
- Shepherd's-purse
- Kochia (including glyphosate resistant biotypes**)
- Tansy mustard
- Volunteer canola (including all herbicide tolerant varieties)*

Apply to actively growing weed up to 10 cm in height.

* 1 to 3 leaf stage for glyphosate tolerant volunteer canola

** Use highest registered rate to control glyphosate resistant kochia.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 40 L per acre. Higher water volumes will give better performance from the carfentrazone active. Use higher volumes when weed populations are dense.

Nozzles & Pressure: Sprayers without drift reduction nozzles should use maximum pressure of 30 psi (210 kPa). Low drift nozzles may require higher pressures for proper performance. Apply using nozzle and pressure combination that deliver an even spray pattern with good coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Most effective control is achieved when grasses are actively growing. Weeds stressed by drought, flooding, hot or prolonged cool temperatures (<15°C) and poor fertility are more difficult to control. Symptoms of carfentrazone activity on weeds may be accelerated by warm moist conditions. Weeds hardened off by drought may be more difficult to control.

Tank Mixes:

Herbicides:
Aim (17 mL/acre)
Fungicides: None registered.
Insecticides: None registered
Fertilizers: None registered.
Do not use with additives that are used to modify spray pH.

Restrictions:

Rainfall: Rainfall within 6 to 8 hours after application may reduce activity. Avoid application when heavy rainfall is forecast.

Re-Entry: DO NOT re-enter treated fields for at least 12 hours.

Preharvest Interval: Leave a minimum of 3 days between harvest aid treatment and harvest.

Grazing: DO NOT graze the treated crop or cut for feed.

Re-cropping: *CleanStart* may be applied as a preseed burn-off prior to the seeding of most crops. Check the product label for a complete list. There are no rotational restrictions 12 months after application.

Aerial Application: DO NOT apply by air

Storage: Store in a cool dry location.

Buffer Zones: Leave a buffer of 3 meters from the downwind edge of the boom to sensitive upland habitats. Apply near wetlands only when wind is blowing away from wetlands.

Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

▽ Caution - **Skin and Eye Irritant**

For an explanation of the symbols used here see page 11.

Clethodim

Herbicide Group
1 - clethodim
(Refer to page 45)

Company:

Arysta LifeScience (*Select* - PCP#22625)
Bayer CropScience (*Centurion* - PCP#27598)
ADAMA Canada (*Arrow* - PCP#28224)
Loveland Products Canada (*Shadow RTM* - PCP#29277)

Formulation:

240 g / L clethodim formulated as an emulsifiable concentrate. Container size - 3 L clethodim + 9 L adjuvant.

Crops, Rates and Staging:

Crops are tolerant at all growth stages although maximum rates but Preharvest Intervals must be observed to prevent excess residue in the grain (see 'Restrictions:').

To a maximum rate of 75 mL per acre:

Chickpea[*]
Dry bean[ε] (black, great northern, navy, pink, pinto, red)
Prairie Carnation[**†]

To a maximum rate of 150 mL per acre:

Alfalfa (seedling only)
Canola
Caraway[ΔΔΔ†]
Coriander[**†]
Dill[ΔΔΔ†]
Fenugreek[***†]
Field pea
Flax (including Solin)
Lentil
Mustard, condiment (brown, oriental, yellow)
Mustard, oilseed types (*B. juncea*)[Δ]
Potato
Safflower[ΔΔ†]
Soybean
Sunflower

[*] **Apply up to the 9 node stage (7 inches or 18 cm maximum height)**

[**] Apply in the 2 to 5 leaf stage, one application per year.

[***] Apply in the 3 to 5 leaf stage, one application per year.

[ε] Registered for all *Phaseolus vulgaris* varieties. Since not all varieties of dry beans have been tested for tolerance to *clethodim*, first use of *clethodim* should be limited to a small area of each variety to confirm tolerance. *Arrow* and *Shadow RTM* are registered for use on black, great northern, navy, pink, pinto, and red dry bean types

[Δ] *Select, Centurion* and *Shadow RTM* only.

[ΔΔ] *Select* and *Centurion* only.

[ΔΔΔ] *Centurion* only.

[†] *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Those who apply these uses do so at their own risk.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

DO NOT apply more than a total rate of 150 mL per acre of these products, or other products containing clethodim, to the same field per season.

Adjuvants: *Clethodim* products must be applied with 0.5 L of *Amigo* adjuvant (*Centurion, Shadow RTM* or *Select*) or *X-ACT* adjuvant (*Arrow*) per 100 L of spray solution (unless otherwise indicated on the label). For spray water sources high in bicarbonate ions (CO_3) see 'Effects of Growing Conditions' section below.

Refer to the product labels for complete mixing instructions. A general guide to mixing can be found on page 14

WEED	RATE (mL/ ACRE)	ACRES TREATED PER 3 L CONTAINER	STAGE
Barnyard grass, foxtail (green, yellow)[*†], **proso millet, volunteer cereals (barley**[*†], canary seed, **corn, oat**[*†], **wheat**[*†]), wild oat[†]	50[**]	60	Apply at 2 to 6 leaf stage. [†] *Apply at the 2 to 4 leaf stage when treated with the 60 acre rate.* *For best results in either case, apply at the 2 to 3 leaf stage*
Moderate to heavy infestations of the above grasses, plus Persian darnel	75	40	
Quackgrass (suppression only)	75	40	2 to 6 leaf stage when 3 to 6 inches (6 to 15 cm) tall. For best results, apply at the 3 to 5 leaf stage
Quackgrass (season long control)	150[***]	20	

[*] **Apply to light infestations of these weeds only for the 60 acre per jug rate. The manufacturers do not provide guidelines** for weed densities under light infestations. When in doubt as to the level of weed infestation, use the higher rate or contact the manufacturer.

[**] **At this rate,** ***clethodim*** should NOT be tank mixed with any other pesticide and should only be applied under the following growing conditions: good crop stand, within the recommended leaf staging (2 to 3 leaf is optimum timing) prior to **tillering, light weed infestations, adequate moisture and fertility, absence of stress, and good growing conditions.**

[***] **Apply with 1 L of adjuvant per 100 L of spray solution** (*Amigo* adjuvant with *Centurion, Shadow RTM* and *Select*, *X-ACT* adjuvant with *Arrow*).

Refer to the product labels for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:

Ground: 20 to 40 L per acre. Use 40 L per acre under dense weed infestations or dense crop canopies.

Aerial: Minimum of 11.3 L / acre.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional 80° flat fan nozzles tilted forward at a 45° angle. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE medium*** droplets or larger.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Clethodim will be less effective when plants are stressed by lack of moisture, excessive moisture, low temperature and / or very low relative humidity. Re-growth of tillers may occur if application is made under any of the above stress conditions.

Clethodim activity is reduced by levels of bicarbonate ions in spray water equal to or greater than 500 ppm. The addition of ammonium sulphate at 1.6 L / acre (480 g / L liquid) or 0.8 kg / acre (99% dry), or the addition of 28-0-0 liquid fertilizer at 0.5 L per acre to the tank prior to the addition of clethodim has been shown to restore control.

Tank Mixes:

Clethodim may be tank mixed with other pesticides at the 75 to 150 mL per acre rates. Add the recommended amount of adjuvant with all tank mixes unless otherwise indicated.

Herbicides:

In flax (not including solin):
Bromoxynil/MCPA ester (label rates) [Δ]
Curtail M (0.6 to 0.8 L / acre)[†]
MCPA ester (rates for flax).
Lontrel at 0.23 to 0.34 L / acre. [†]

In Solin (low linolenic flax):
Bromoxynil/MCPA ester (label rates) [Δ]
Curtail M (0.6 to 0.8 L / acre)[†]
Lontrel at 0.23 to 0.34 L / acre[†]

In canola:
Lontrel at 0.17 to 0.34 L / acre[†]
Muster at 8 to 12 g / acres[†] (redroot pigweed is controlled at the 8 g / acre rate of *Muster* in this tankmix).

In Clearfield canola only:
Pursuit at 42 to 85 mL / acres[†]

In Liberty Link canola only:
Liberty at 1.1 to 1.35 L / acre plus *clethodim* at 25.5 mL / acre (120 acres / case) plus 0.5 L of the recommended adjuvant per 100L of spray solution. When mixing add adjuvant to the water first, then *Liberty*, then *clethodim*. Consult labels for detailed mixing instructions.

In field peas:
Pursuit (85 mL / acre)[†]

In Glyphosate tolerant soybean:
Glyphosate (360 to 720 g ae / acre).[†✧]

[*] Light infestations only in Clearfield canola. For heavy infestations, use high rate of *Pursuit*.

[†] Apply with the 75 mL / acre rate of clethodim only.

[Δ] Manufacturers may only support specific mixes. Contact the manufacturer for more information.

[✧] *Arrow* only.

Allow 4 days between application of clethodim and any other chemical not recommended as a tank mix combination on the label.

Fertilizer: None registered.

Insecticide: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *clethodim* labels only.

***Clethodim* manufacturers also support mixes with pesticides that are not on the clethodim labels.**

Herbicides: *Liberty 150* (clethodim rates of 50 mL / acre)

Check with each manufacturer for other products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or cut treated crops for forage until 60 days after application of clethodim to annual crops, and 30 days after application to seedling alfalfa.

Preharvest Interval:

Preharvest Interval (days)	CROP(S)
30	Alfalfa, fenugreek
60	Canola, coriander, dry beans, flax (including Solin), lentils, potatoes, chickpeas (Desi and Kabuli) or mustard (brown, yellow, oriental)
72	Sunflower
75	Soybeans, field peas

Aerial Application: Only *Centurion*, *Shadow RTM* and *Select* may be applied by air in canola, chickpea, dry bean, flax, field pea, lentil, mustard, potato, soybean, sunflower only.

Storage: May be stored at any temperature. Shake well before use.

Other: DO NOT apply more than 0.15 L per acre to the same land area per season.

Buffer Zones:

Application Method	Crops	Buffer Zones (metres †) Required for the Protection of:
		Terrestrial habitat
Ground	All Crops	15
Aerial	Desi and Kabuli chickpeas, dry common beans	15
	Other Registered Crops	*20*

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general Sprayer Cleaning section on page 15-16.

Hazard Rating:

Select, Shadow and Centurion:

◇ Warning - Skin and Eye Irritant

Arrow:

▽ Caution – Skin and Eye Irritant

For an explanation of the symbols used here see page 11.

Clever **(this referring text to be removed in the 2018 edition)**

See quinclorac on page 278.

Clodinafop

Herbicide Group
1 - clodinafop
(Refer to page 45)

Company:

ADAMA Canada
(*Ladder* - PCP#29495; *ADAMA Adjuvant 80* PCP#30419)

AgriStar
(*Slam'R* - PCP#30137; *Slam'R COC Adjuvant* - PCP#30138)

Arysta LifeSciences
(*NextStep NG* - PCP#29614, built in adjuvant)

E. I . duPont Canada
(*Harmony Grass 240 EC* - PCP#31689; *Harmony Adjuvant* - PCP#31690)

Farmers of North America
(*Aurora* - PCP#29711; *Chem-Spray COC Adjuvant* - PCP#29712)

FMC of Canada
(*Bullwhip* - PCP#30445; *XA Oil Concentrate Adjuvant* - PCP#11769)

Great Northern Growers
(*Foax* - PCP#31261; *MANA 8317 Oil Concentrate* - PCP#30030)

Loveland Products Canada
(*Foothills NG* - PCP#30341; built in adjuvant)

Nufarm Agriculture
(*Signal* - PCP#29172; *Enhance Adjuvant* PCP#29952)

Syngenta Canada
(*Horizon NG* - PCP#29089; built in adjuvant)

* This product is no longer manufactured but some product still remains in the retail system. This product may not be in future editions.

Formulation:

Aurora, BullWhip, Foax, Harmony Grass 240EC, Ladder, Signal, Slam'R: 240 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

Container size** - 3.68 L, 11 L, 14.72L, 18.4 L, 2 x 11.04 L, 58.9 L.

MANA 8317 Oil Concentrate, Slam'R COC and ***XA Oil Concentrate Adjuvants:*** 2 x 6.4 L.

Enhance Adjuvant: 4 L, 16 L, 64 L.

ADAMA Adjuvant 80, Harmony Adjuvant: 4 L; 12 L

Horizon NG*, Foothills NG*, NextStep NG*: 60 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.

Container size** - 2 x 7.57 L, 121.1 L or 424.4 L (not available for *Horizon NG*).

* These products have a built in adjuvant system and does not require the addition of an adjuvant.

** Package size availability varies by company. Not all sizes may be available from each company.

Crops and Staging:

Spring wheat (including durum) - prior to the emergence of the 4th tiller.
When tank mixing, check broadleaf product description for additional restrictions.

Weeds, Rates and Staging:

NG Formulations: 376 mL per acre, no additional adjuvant required (packages listed above treats 40, 322 or 1129 acres).
-or-
240EC Formulations: 93 mL per acre plus recommended adjuvant at 0.8 L per 100 L spray solution. For *Signal* only add ***Enhance*** adjuvant, for *Ladder* add ***ADAMA Adjuvant 80***, or for *Harmony Grass 240EC* add ***Harmony Adjuvant***, at 0.25 L per 100L spray solution).

For control of:

WEED	STAGE
Barnyard grass	1 to 5 leaf prior to tillering
Green and yellow foxtail	1 to 5 leaf stage, prior to emergence of 3rd tiller
Volunteer canaryseed, wild oats	1 to 6 leaf, maximum 3 tillers
Volunteer oats	3 to 6 leaf, maximum 3 tillers

NG Formulations: 474 mL per acre, no additional adjuvant required (package sizes above treats 32, 258 or 903 acres);
-or-
240EC Formulations: 115 mL per acre plus recommended adjuvant at 1.0 L per 100 L spray solution of the recommended adjuvant. For *Signal* only add ***Enhance*** adjuvant, for *Ladder* add ***ADAMA Adjuvant 80***, or for *Harmony Grass 240EC* add ***Harmony Adjuvant***, at 0.32 L per 100L spray solution).

For control of:

WEED	STAGE
Persian darnel	1 to 5 leaf prior to tillering

Apply at the 2 to 3 leaf stage for optimum control.
Optimum weed control and yield response occurs when weeds are controlled before tillering.
Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:
Ground – 20 L to 40 L per acre.
Aerial – 12 L/acre.

Nozzles and Pressure: 40 to 45 psi (275 to 310 kPa) when using conventional 80° or 110° flat fan stainless steel nozzles tilted forward at an angle of 45°. **Low drift nozzles may require higher pressures for proper performance.** Consult with herbicide manufacturer regarding the suitability of low drift nozzles for use with this product.

Tank Mixes:

Mixes provide control of wild oat, green foxtail, and weeds / insects controlled by the tank mix partner unless otherwise noted.
Herbicides:

	Aurora	*BullWhip*	*Foax*	*Harmony Grass 240EC*	*Ladder*	*NG Formulaitons*	*Nufarm Clodinafop*	*Signal*	*Slam'R*
2,4-D amine (160 to 212 g ae / acre)††	•	•	•	•	•	•	•	•	•
Bromoxynil #	•	•	•	•	•	•	•	•	•
*Bromoxynil/MCPA**** #	•	•	•	•	•	•	•	•	•
Bromoxynil/2,4-D (label rates)	•	•	•	•	•	•	•	•	•
Curtail M (0.6 to 0.81 L / acre)	•	•	•	•	•	•	•	•	•
Dichlorprop/2,4-D (0.71 L / acre)**	•Δ	•	•Δ	•	•Δ	•Δ	•Δ	•Δ	•Δ
DyVel (0.4 to 0.50 L / acre)	•	•	•	•	•	•	•	•	•
Lontrel 360 (0.17 to 0.34 L / acre)					•	•		•	
Lontrel 360 (0.11 to 0.17 L / acre) + *MCPA ester* (0.45 L / acre)††	•	•	•	•	•	•	•	•	•
MCPA 600 amine or 600 ester†† (0.34 to 0.45 L / acre)	•	•	•	•	•	•	•	•	•
MCPA Sodium Salt (0.48 to 1.09 L / acre)*					•	•		•	
Mecoprop-p (2.2 to 2.8 L / acre)					•	•		•	
Metsulfuron (3 g / acre)††† #	•		•		•	•	•	•	•
Pulsar (80 acres / case)						•			
Pulsar + MCPA Ester (rates above)						•			
Refine SG (12 g / acre) ††† or (N = *Nimble* (8 g / acre)††† #		N		N		•		•	
Target (0.4 to 0.6 L / acre)**					•	•		•	
Trophy (20 acres per case)					•	•		•	

Refer to the broadleaf herbicide label for crop staging, and other information. When tank mixing *clodinafop 240 EC*, always add the broadleaf herbicide first, followed by *clodinafop*, with the adjuvant added last. Reductions in green foxtail and wild oat control may be observed when tank mixed with *2,4-D amine* and *MCPA amine*.

Insecticides: *Matador* (25 to 33 mL / acre) .✧
Fungicides: *Tilt* (0.1 L# to 0.2 L / acre).✧
Fertilizers: None registered.

Clodinafop may also be mixed with *Matador* plus *Tilt* at the rates above.✧

# Check product label for specific tank mix partners and appropriate rates
Δ NOT for use with *Estaprop XT* or *Dichlorprop DX*.
* Rate above 0.81 L / acre may cause crop injury.
** Barnyard grass also controlled.

Legend continued on next page.

*** Barnyard grass and Persian darnel also controlled. May be applied by air.

†† See 2,4-D page for equivalent formulation rates.

††† Additional adjuvants are not required.

✧ All products except *Aurora*

Note: The above mixes are those listed on the *clodinofop* labels only.

***Clodinafop* manufacturers may also support mixes with pesticides that are not on the *clodinafop* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

For optimum results, apply to actively growing weeds. Do not apply to crops or weeds that are stressed by hot or cool conditions, frost, drought, low fertility, water saturated soil, disease or insect damage as crop injury and poor weed control may result.

Restrictions:

Rainfall: Within 30 minutes may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze or harvest treated crops for forage within 3 days of application.

Preharvest: Leave at least 60 days from application to harvest.

Re-cropping: No restrictions in the year following treatment.

Storage: May be frozen.

Aerial Application: May be applied by air.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground *	15	0
Aerial	72	76

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method B' in the general tank cleaning section on page 15 to 16. If mixed with other pesticides, the cleaning method above should be combined with the method recommended for the tank mix partner if different from above.

Hazard Rating:

240EC formulations:

▽ Caution – Poison

◇ Warning – Eye and Skin Irritant

NG formulations:

▽ Caution – Eye and Skin Irritant

All except *Ladder*:

◇ Warning – contains the allergen soy.

For an explanation of the symbols used here see page 11.

Conquer

Herbicide Group
6 - bromoxynil
14 - carfentrazone
(Refer to page 45)

This product is a prepackaged tank mix of *bromxynil* (page 116) and *Aim* (page 87). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Nufarm Agriculture

Formulation:

The *Conquer* package contains the following components:

***Aim* (PCP#28573)):** 240 g / L carfentrazone formulated as an emulsifiable concentrate.
Container size – 2 x 600 mL

***Koril 235* (PCP#25341):** 235 g / L bromoxynil formulated as an emulsifiable concentrate.
Container size - 2 x 9.71 L

Crops and Staging:

Apply prior to the seeding of canola

Rates

Aim: 15 mL / acre

Koril 235: 243 mL / acre

One case treats 80 acres

Weeds and Staging:

Weeds controlled by Aim and bromoxynil plus:
Volunteer canola - fully expanded cotyledon to the 4 leaf stage

Tank Mixes:

Herbicides:
Glyphosate (label rates)

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Curtail M

Herbicide Group
4 - clopyralid & MCPA
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30194)

Formulation:

50 g/L clopyralid and 280 g/L MCPA ester formulated as an emulsifiable concentrate.

Container size - 8 L, 112 L, 960 L.

Crops and Staging:

Apply at the 3 leaf to just before the flag leaf stage of the following crops:

Barley
Canaryseed*
Oat
Timothy (established for seed, and hay or forage production)*
Wheat (spring & durum)

Flax and Solin (low linolenic acid flax) at 2 to 6 inches (5 to 15 cm) height.

NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Those who apply these uses do so at their own risk.*

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

The following weeds are controlled at the 1 to 4 leaf stage unless specified:

At 0.61 L per acre (8 L jug treats 13 acres):

Burdock
Canada thistle (low infestations)***
Cocklebur
Field horsetail†
Flixweed**
Lamb's-quarters
Plantain†
Prickly lettuce
Ragweed
Shepherd's-purse**
Stinkweed**
Sunflower (annual)
Volunteer sunflower
Wild mustard
Wild radish
Vetch

At 0.81 L per acre (8 L jug treats 10 acres) the above weeds and:

Annual sow thistle
Canada thistle (medium to high infestations)***
Common groundsel
Dandelion*
Kochia (suppression only)**
Perennial sow thistle†
Redroot pigweed
Russian pigweed
Scentless chamomile**
Smartweed
Tartary buckwheat
Volunteer canola
Wild buckwheat

* Spring rosettes only.
** 2 to 4 leaf stage, (spring seedlings only for winter annual weeds).
*** Season long control, some regrowth may occur in the fall. Apply from the 4 inch (10 cm) to prebud stage.
† Top growth control only.

Application Information:

Water Volume:
Canary seed and timothy: 40 to 80 L per acre
All other crops: 40 to 60 L per acre.

Nozzles & Pressure: Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage. Flat fan tips tilted forward at a 45° angle are recommended in flax.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool (less than 15°C) temperatures, weeds are not actively growing and control may be reduced. DO NOT apply to weeds stressed longer than 20 days from lack of moisture as poor control can result.

Tank Mixes:

Curtail M at 0.81 L per acre should be used in all tank mixes unless otherwise indicated. See labels for adjuvant rates.

Herbicides:

In spring wheat (including durum) and barley:
Achieve Liquid (0.20 L/acre) plus *Turbocharge* adjuvant
Assert (0.52 to 0.64 L/acre) plus water pH adjuster
Check product labels for additional crop staging restrictions.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Curtail M* label only.

Nufarm Canada supports the following mixes not found on the label. Apply mixes according to the most restrictive use limitations for either product:
Wheat Including Durum and Barley: *Assert 300SC, Achieve Liquid, Nufarm Tralkoxydim*
Wheat (NOT Durum) and Barley: *Axial BIA*
Wheat (NOT Durum): *Varro, Everest 2.0, Signal, Fenoxaprop, Traxos, Simplicity*
Flax: *Poast Ultra, clethodim (Select/Centurion only)*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours will reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated fields or cut for hay within 7 days of application.

Preharvest Interval: Leave 60 days between application and harvest.

Re-cropping: Wheat, barley, oats, rye, corn, flax, canola, forage grasses and mustard may be planted the year after application. DO NOT under-seed crops to forage legumes the year after treatment.

DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local Nufarm Agriculture Inc. representative or retailer for more information before seeding field peas following drought conditions in the previous year.

DO NOT sow ***any other*** crops until the second year after application. Apply manure bedded with straw from treated crops only to the crops listed above.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70%** when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Caution - Poison

Caution - Eye Irritant

For an explanation of the symbols used here see page 11.

Dicamba

Herbicide Group
4 - dicamba
(Refer to page 45)

Company:

BASF Canada (*Banvel II*) (*Banvel VM* - distributed by Engage Agro)

Gharda Chemicals (*Oracle, VMD 480 Dicamba, Hawkeye Power* - distributed by Adjuvants Plus)

Formulation:

Banvell II **(PCP#23957)**, ***Banvel VM*** **(PCP#29249):** 480 g/L dicamba formulated as a solution of a diglycolamine salt.

Oracle **(PCP#26722)**, ***VMD 480 Dicamba*** **(PCP#29251)**, ***Hawkeye Power*** **(PCP#29223):** 480 g/L dicamba formulated as a solution of a dimethylamine salt.

Container sizes - 2 x 10 L jugs.

Crops, Rates and Staging:

Banvel II, Oracle, Hawkeye Power and *VMD 480 Dicamba* are registered for the all of the uses below. *Banvel VM* is only registered for pasture and rangeland uses below.

CROP	STAGE	RATE	
		(mL per acre)	Acres per 10 L
Spring wheat*	2 to 5 leaf.	93 to 117	107.5 to 85
Barley*	2 to 5 leaf.	93 to 117	107.5
Oats*	2 to 5 leaf.	93 to 117	107.5 to 85
Canaryseed*	3 to 5 leaf.	117	85
Winter wheat*	In spring 6 to 10 inches (15 to 25 cm) prior to flag leaf	93 to 117	107.5 to 85
Spring rye*	2 to 3 leaf	93 to 117	107.5 to 85
Corn, field	**Broadcast up to 8 inches (20 cm). When** higher, use drop nozzles.	243 to 505	41 to 20
Corn, field + 2,4-D	Apply no later than 2 weeks prior to tassle emergence and prior to 20 inches (50 cm).	117	85
Red fescue (for seed production)	*Seedling:* 2 inches (5 cm) tall. *Established:* up to the flag leaf stage.	243	41
Pastures	**Established and actively growing**	850 to 1,480 (0.85 to 1.48 L)	11.7 to 6.8
Seedling grasses (for seed and forage production): Fescue (creeping red, meadow, tall), Meadow foxtail, Orchardgrass, Smooth bromegrass, Timothy, Wheatgrass (crested, intermediate, pubescent, slender, streambank, tall)	2 to 4 leaf	93 to 117	107.5 to 85
Fall stubble	Apply according to weed stage.	1000 (1.0 L)	10
Fall stubble + glyphosate	Apply according to weed stage.	500	20
Pre seeding cereals	Apply according to weed stage.	127	79
Chemfallow + 2,4-D	Apply according to weed stage.	93 to 117	107.5 to 85
Chemfallow + glyphosate	Apply according to weed stage.	117 to 243	85 to 41

*** Should be mixed with a tank mix partner for broad spectrum control**

Weeds, Rates and Staging:

Apply to annual broadleaf weeds at the 2 to 3 leaf stage and to winter annual rosettes up to 2 in. (5 cm) across.

Dicamba applied alone at 93 to 117 mL per acre will control:

Cleavers (high rate only)
Cow cockle
Corn spurry
Canada thistle*
Perennial sow-thistle*
Smartweed (green , lady's-thumb)
Tartary buckwheat
Wild buckwheat

Dicamba at 243 to 505 mL per acre will control:
Weeds listed above plus:

Canada thistle**
Canada fleabane
Field bindweed**
Lamb's-quarters
Mustard (hare's ear, Indian, tumble, wild, wormseed)
Perennial sow-thistle**
Pigweed (redroot, Russian)
Ragweed (common, false, giant)

Dicamba at 0.85 L per acre in rangeland or 1.0 L per acre in fallow will control:
Weeds listed above plus:

Curled dock*
English daisy
Goldenrod
Tansy ragwort

Dicamba at 1.86 L per acre will control:
Weeds listed above plus:

Diffuse knapweed
Goat's beard
Ground cherry
Pasture sage
Povertyweed
Sheep sorrel
Thyme-leaved spurge

* Top growth only.
** Three consecutive years of treatment are required for complete control.

The following chart indicates weed and brush controlled by dicamba + 2,4-D mixes at the listed rates.

WEEDS	RATE (L/acre)†	
	Dicamba	2,4-D (600 g/L forms)
Poison ivy	0.67	0.76
Wild carrot	0.85	0.76
Aspen poplar	1.32	1.52
Prickly rose, western snowberry†††	1.48	1.52
	RATE (L/1000 L of water)††	
Alder, aspen poplar, cherry, western snowberry, wolf willow, wild rose	0.85	1.33

† Applied by broadcast sprayer.

†† Apply to the foliage and stems to the point of run-off using high volume equipment.

††† Ester formulations of 2,4-D only.

Canada thistle, Perennial sow-thistle in fallow: Apply prior to the bud stage. Must be applied to thistle plants with 6 to 10 inches (15 to 25 cm) of new growth.

Canada thistle control in fall after harvest: When thistles exhibit new growth and at least 2 weeks prior to a killing frost.

Refer to label for full lists of weeds controlled by dicamba plus tank mixes in cereals, pastures, fallow and other situations.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Brush control in pastures: When brush is actively growing and is 6 feet (2 m) in height or less (in spring or early summer). Growth greater than 2 meters may be cut and allowed to regrow prior to treatment.

Application Information:

Water Volume:

Preseeding burnoff: 20 to 45 L per acre.
Annual crops: at least 45 L per acre.
Pastures, fallow and stubble: 45 to 90 L per acre.
Corn: 90 to 140 L per acre.
Brush: high volumes to the point of run off.

Nozzles and Pressure:

Broadcast application: Maximum 40 psi (275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver even coverage of ***ASABE coarse*** droplets.

Brush Control: Use high volume spray equipment producing large droplets including, but not limited to, hand-wand, boomless nozzle and Radi-Arc technologies.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop damage (stunting, reduced seed set) can occur if the chemical is applied at any time other than the recommended stage. DO NOT apply to crop under stress from adverse environmental conditions, such as excess moisture, drought and disease. Apply when air temperature is between 10 and 25°C.

DO NOT apply:
- when there is a risk of severe temperature fall in the night;
- under high humidity, temperatures above 30°C, or fog conditions, to prevent drift to sensitive crops;
- when wind is blowing toward a nearby sensitive crop;
- when winds are gusty up to 5 mph (8 km/hr).

Tank Mixes:

Herbicides:

	Spring wheat	Winter wheat	Barley	Oats	Seedling grasses
2,4-D Amine 160 g ae/L	✓	✓	✓		✓
MCPA Amine (0.34 L/acre)	✓	✓	✓	✓	✓
MCPA K (0.44 L/acre)	✓	✓	✓	✓	✓
Sencor (0.11 to 0.17 L/acre)	✓		✓		
Ally (2 g/acre)	✓		✓		

In Canaryseed: *MCPA* amine (0.34 L/acre - 500 g ai/L formulation)

In Corn, Spring rye: *2,4-D amine* (160 g ae/acre)

In Corn (Banvel II only):
Accent (13.5 g/acre) plus non-ionic surfactant
Option 35DF (40 g/acre) plus *Hasten* adjuvant plus liquid 28-0-0 (*Banvel II* at 0.12 L/acre) (Manitoba only).
Option 2.25 OD (0.63 L/acre) plus liquid 28-0-0 (*Banvel II* at 0.12 L/acre) (Manitoba only).

In Chemical fallow, stubble: *2,4-D*, glyphosate products.

In Red fescue: *2,4-D* amine (287 g ae/acre)

In Preseeding burnoff: Glyphosate (136 g ae/acre - see glyphosate page for product rates)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the dicamba labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing and Harvest Intervals:

Canaryseed: Use only as birdseed.

Corn: DO NOT graze cattle or harvest for silage until 7 days after treatment of dicamba alone or for at least 12 weeks following dicamba tank mixes with other herbicides.

Cereals, seedling grasses, pasture: DO NOT harvest for silage for or graze lactating dairy cattle until 7 days after treatment. If treated vegetation has been consumed by dry dairy animals or meat animals within 30 days of dicamba application, feed the animal with untreated diet for 30 days before slaughter. Meat animals or dry dairy animals may graze or feed on treated pasture 3 days after dicamba application without restrictions on slaughter. Feed untreated forage within 3 days of slaughter.

Re-cropping: Grow only cereals, corn, soybeans or white beans the year after treatment with the 1.0 L per acre rate. Grow only cereals, corn, field beans, soybeans or canola the year after applications of 0.5 L per acre. If applications are made after September 1, or if dry weather persists after application, crop injury may occur the following spring.

Aerial Application: May be applied by air on cereals only. Use a minimum water volume of 8 L per acre.

Storage: May be stored at freezing temperatures.

Buffer Zones:

Application method	CROP	Buffer Zones (metres[†]) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground[*]	Barley, oats, rye, wheat, canary seed, seedling forage grasses	0	0	1
	Corn, established forage grasses, red fescue	1	1	4
	Stubble, fallow	1	1	5
	Pasture and rangeland	1	1	10
Winged airplane	Barley, oats, rye, wheat,	0	0	50
Helicopter		0	0	45

See page 36 for an explanation of the different habitats.

[*] **Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.**

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Buffers are not required for handheld and backpack applications.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

☠ Caution -Poison

⚠ **Warning – Eye Irritant**

For an explanation of the symbols used here see page 11.

Dicamba/Mecoprop/ MCPA

Herbicide Group
4 - dicamba, mecoprop-p & MCPA
(Refer to page 45)

Company:

Syngenta Canada (*Target* - PCP#28028)
Loveland Products Canada (*Sword* - PCP#27892)
IPCO (*Tracker XP* - PCP#27790)

Formulation:

275 g/L MCPA + 62.5 g/L mecoprop-p + 62.5 g/L dicamba formulated as a solution.

Container size - 2x10 L and 160 L (*Target*), 500 L (*Sword*), 1000 L (*Sword*).

Crops and Staging:

All Products:
Cereals:

CROP	STAGE
Barley	2 to 4 leaf (3 leaf for best crop safety)
Canaryseed, Oats, Spring wheat (including durum)	2 to 5 leaf (3 to 4 leaf for best crop safety)
Winter wheat	Spring application only: up to 12 inches (30 cm) high (top leaf extended)
Fallow	Fall stubble

***Target* and *Sword* only:**
Seedling grasses grown for forage only (NOT for seed production)*:
Apply at the 2 to 4 leaf stage.

Creeping red fescue
Wheatgrass (crested, intermediate)
Meadow foxtail
Orchardgrass
Smooth bromegrass
Timothy

Established grasses for forage only (NOT for seed production)*:
Apply up to flag leaf stage.

Bromegrass (meadow, smooth)
Fescue (creeping red, meadow, tall)
Kentucky bluegrass
Meadow foxtail
Orchardgrass
Timothy
Wheatgrass (crested, intermediate, pubescent, slender, streambank, tall, western)

** NOTE: Use only one application per year by ground. Since applications to forage grasses in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to forage grasses are at the risk of the user.***

Weeds and Staging:

Weeds controlled at the 2 to 3 leaf stage unless otherwise indicated:

Annual sow-thistle
Ball mustard
Canada thistle (6 to 8 inches (15 to 20 cm) and actively growing)*
Cleavers (1 to 2 whorls)
Common ragweed
Corn spurry
Cow cockle
Field bindweed*
Flixweed
Hedge bindweed*
Hemp-nettle (less than 2 pairs of true leaves)
Knotweed
Kochia
Lamb's-quarters
Night-flowering catchfly
Perennial sow-thistle*
Prostrate pigweed
Redroot pigweed
Russian thistle (less than 2 inches-5 cm)
Shepherd's-purse
Smartweed (green, lady's-thumb)
Stinkweed
Tall mustard
Tartary buckwheat
Volunteer buckwheat
Volunteer canola
Volunteer sunflowers
Wild buckwheat
Wild mustard
Wormseed mustard
Yellow mustard

* Top Growth Control only

Rates:

0.4 to 0.6 L per acre (10 L treats 25 to 16.7 acres).

Use the higher rate under adverse weather conditions, when weed density is high, for cleavers control, winter annual control and for suppression of Canada thistle and perennial sow-thistle.

Although *dicamba/mecoprop-p/MCPA* is registered up to the 5 leaf stage of the crop for the rates listed here, the low rate should be used when the crop is at the 5 leaf stage for optimum crop safety.

For Canada thistle, post harvest or fallow application, use 0.81 L per acre (one 10 L container treats 12.4 acres).

Application Information:

Water Volume:
Ground: Minimum 40 L per acre.
Aerial: Minimum of 12 L per acre

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE coarse*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Hot and dry or cold and wet weather prior to spraying may result in reduced weed control and increased crop injury. Do not apply within 2 weeks of a killing frost.

Tank Mixes:

Herbicides:

Spring wheat (including durum):
Horizon NG *(label rates - no adjuvant required)

Wheat and Barley:
Sencor or *linuron* for chickweed control.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

* *Target* only.

Note: The above mixes are those listed on the *dicamba / mecoprop-p/MCPA* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Activity may be reduced if rainfall occurs within 3 hours of application. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or harvest for livestock feed within 7 days of application.

Preharvest: Leave at least 80 days from application to harvest.

Re-cropping: No restrictions the year after application.

Aerial Application: All may be applied by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Crops	Buffer Zones (metres†) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground *	Standing Crops	1	1	5
	Fallow and stubble	1	1	5
Fixed wing airplane	Cereals	1	0	60
	Canaryseed	1	0	75
	Forage	1	0	75
	Fallow and stubble	5	1	100
Helicopter	Cereals	1	0	50
	Canaryseed	1	0	60
	Forage	1	0	60
	Fallow and stubble	4	1	80

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Buffers are not required for handheld and backpack applications.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

☠ Caution – Poison

⚠ **Warning – Eye Irritant**
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Dichlorprop/2,4-D

Herbicide Group
4 - dichlorprop & 2,4-D
(Refer to page 45)

Company/Products:

Loveland Products Canada (*Turboprop*)
Nufarm Agriculture (*Estaprop XT*)
IPCO, Loveland Products Canada (*Dichlorprop D*)
IPCO (*Dichlorprop DX*)

Formulation:

Turboprop **(PCP#27967);** ***Dichlorprop-D*** **(PCP#27966):** 300 g/L of dichlorprop and 282 g/L of 2,4-D ester formulated as an emulsifiable concentrate.

Estaprop XT **(PCP#29660);** ***Dichlorprop-DX*** **(PCP#29664):** 210 g/L of dichlorprop-P* and 400 g/L of 2,4-D ester formulated as an emulsifiable concentrate.

* NOTE: dichlorprop-P is a more active version of dichlorprop.

Container sizes:

Turboprop, Dichlorprop-D - 2 x 10 L, 115 L

Estaprop XT - 2 x 9.7 L, 97.1 L, 466.1 L.

Dichlorprop-DX - 2 x 10L, 115 L

Crops and Staging:

Wheat (spring, durum) and barley - 4 leaf until the early flag leaf stage.

Winter wheat - in spring from tillering to the early flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Rates:

Turboprop; Dichlorprop-D: 0.71 L per acre
One 10 L container treats 14 acres
One 10.6 L container treats 15 acres

Estaprop XT **(PCP#29660);** ***Dichlorprop-DX*** **(PCP#29664):** 486 mL per acre.
One jug treats 20 acres

How it Works:

Refer to Table 2 on page 47.

Weeds and Staging:

Treat weeds when young and actively growing and before they are shielded by the crop. Additional stage restrictions indicated are the minimum indicated over all labels. Check individual labels for exceptions.

Annual sow thistle
Ball mustard
Bluebur
Burdock
Canada thistle*
Cocklebur
Curled dock*
Dandelion ***
Dog mustard
Flixweed
Hare's ear mustard
Indian mustard
Kochia (Up to 2 inches)
Lamb's-quarters
Night flowering catchfly◊
Oak leaved goosefoot
Perennial sow-thistle*
Prickly lettuce (2 to 12 leaf)†
Ragweed (Common, Giant†† ◊◊)
Redroot pigweed
Round leaved mallow
Russian pigweed
Russian thistle (Up to 2 inches)
Shepherd's purse
Spreading Atriplex (cotyledon to 10 leaf)††
Stinkweed
Stork's bill
Toadflax**
Tumble mustard
Volunteer canola
Wild mustard
Wormseed mustard

Control the following weeds up to the 4 leaf stage:

Smartweed (including lady's thumb)
Tartary buckwheat
Volunteer Sunflower
Wild buckwheat

* Top growth control only
** Suppression only. Treat before the majority reach 6 inches (15 cm).
*** *Estaprop XT* and *Dichloroprop D* only season long control in winter wheat.
◊ Spring annuals only
◊◊ Treat prior to the 6 leaf stage
† *Estaprop XT* and *Dichloroprop D* only in winter wheat.
†† *Estaprop XT* in winter wheat only.

Application Information:

Water Volume:
Ground: 20 to 97 L per acre*. Use a minimum of 40 L of water per acre to reduce the risk of drift.
Aerial: Minimum 12 L per acre.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE coarse*** droplets or larger.

* May vary by product. Check label closely.

Effects of Growing Conditions:

Applications made under dry conditions may result in reduced control. Crops under stress from adverse environmental conditions, such as excess moisture, frost or drought, may be injured. Best weed control when adequate soil moisture is present and warm temperatures prevail. DO NOT apply when daytime temperatures exceed 27°C.

Tank Mixes:

Herbicides: *Estaprop XT, Dichlorprop DX and Turboprop only*

Tank Mix Partner (Mixed at label rates unless otherwise indicated)	CROPS			
	Spring wheat	Durum	Winter wheat	Barley
Imazamethabenz[Δ]	•	•		•
Clodinafop[Δ]	•	•		
Fenoxaprop[Δ]	•	•		•[†]
Thifensulfuron/ tribenuron[Δ††]	•	•	•	•
Tralkoxydim[Δ]	•	•	•	•

[†] *Cordon, Vigil WB* and *WildCat* only.

[††] *Estaprop XT* only.

[Δ] Manufacturers may only support mixes with specific products. Contact the manufacturer for more information.

Note: Always refer to the label or the page for the tank mix partner in this guide for additional restrictions on staging and varieties.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on *dichlorprop+2,4-D/dichlorprop-P+2,4-D* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: Leave 12 hours before entering treated fields.

Grazing: DO NOT graze the treated crop or harvest for hay or feed within 40 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Preharvest Interval: Leave 40 days from spraying until harvest of winter wheat and 60 days for other crops.

Re-cropping: No restrictions the year after application. Fields treated with *Estaprop XT* may be replanted after a minimum of 30 days.

Aerial Application: May be applied by air. Refer to specific product labels for full details for application by air.

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat[**]
	Less than 1 m	Greater than 1 m	
Ground	1	1	1
Fixed wing aircraft	10 (5[††])	1	45 (30[††])
Helicopter	10 (3[††])	1	40 (30[††])

See page 36 for an explanation of the different habitats.

[*] Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[**] Handheld or backpack sprayers do not require a buffer zone.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

[††] *Dichlorprop - DX* and *Estaprop XT*.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15-16.

Hazard Rating:

Warning - Poison

Warning - Skin Irritant (*Turboprop*)

Caution - Skin Irritant (*Dichloroprop-D*)

For an explanation of the symbols used here see page 11.

Diquat

Herbicide Group
22 - diquat
(Refer to page 45)

Company:

Syngenta Canada (*Reglone, Reglone Ion, Desica*)

Sharda Cropchem, distributed by Engage Agro, Great Northern Growers (*Diquash/Dessicash*)

Loveland Products (*Stage*)

Univar (*Masterline Diquat*)

Formulation:

Desica **(PCP#30488)**; ***Diquash/Dessicash*** **- PCP#31406; *Stage* (PCP#31597); *MasterLine Diquat* (PCP#31837); *Reglone* (PCP#26396):** 240 g / L diquat ion (present as dibromide) formulated as a solution.
Container size - 2 x 10 L and 115 L (not available for *Diquash*).

Reglone Ion **(PCP# 31058)**: 200 g / L diquat formulated as a solution. Comes with a built-in adjuvant
Container size - 2x10 L, 115 L, 450 L.

Crops and Staging:

Diquat is used to dry immature green material at top of indeterminate crops and green weeds to facilitate harvest. *Diquat* **will not speed maturity of green crops. Treatment before the recommended stage can result in reduced yield and quality.** Add 0.1 L of *Agral 90* or 0.25 L of LI 700 **per 100 L of spray solution for all applications of** 240 g / L **formulations. Do not** add adjuvant for applications of *Reglone Ion*. Refer to product labels for specific recommendations for adjuvant use.

		RATE (L/ACRE)			
		240 g/L formulations		*Reglone Ion*	
CROP	STAGE	Ground	Aerial	Ground	Aerial
Canola*	80-90 percent of seed has turned brown.	0.50 to 0.69†	0.69 to 0.93v	0.61 to 0.81†	0.81 to 1.11†
Dry Beans - Red and white kidney	Crop has lost 80 to 90 percent of leaves and 80 percent of pods are yellow.				
Soybeans					
Faba beans	Most plants are ripe and dry. Pods fully filled, bottom pods are tan or black in colour.				
Flax and Solin (low linolenic acid flax)	75 percent of bolls brown.				
Lentils	**Lowest pods are light brown and rattle** when shaken.				
Mustard (condiment type only)	75 percent of seed has turned brown.				
Peas	**Bottom pods are ripe and dry, seeds** detached from pods.				
Sunflowers	**Backs of sunflower heads and bracts are** turning yellow and seed moisture is 20 to 50 percent.				
Chickpeas	Plants yellow, pods mature, seeds changed colour and detached from pods.	0.50 to 0.69†	0.69	0.61 to 0.81†	0.81

Crops and Staging continued on next page.

Crops and Staging *continued*

		RATE (L/ACRE)			
		240 g/L formulations		*Reglone Ion*	
CROP	STAGE	Ground	Aerial	Ground	Aerial
Potatoes (top growth mature and few weeds)	Two weeks prior to harvest.	0.5	Requires 2 Passes **Pass #1:** 0.69 to 0.93 L/acre** **Pass #2:** (4 to 5 days later) at 0.5 L/acre	DO NOT use ***Reglone Ion*** on Potatoes	
Potatoes (some top growth and/or some weeds)		0.69 to 0.93**†			
Potatoes (dense crop, heavy weed infestations)		1.42**†			
Alfalfa, bird's -foot trefoil, red and white clover (for seed production only)***	Pods are ripe but before shattering. Harvest within 7 days.	0.69 to 1.09†	0.69 to 1.09†	0.81 to 1.32†	0.81 to 1.32†

† Use high rates for dense crops and/or heavy weed infestations.
* This product can cause shattering losses in canola. It should only be used on *B. napus* canola to assist in the harvest of a severely lodged crop.
** DO NOT use an adjuvant on potatoes except at the 0.5 L per acre ground application rate.
*** DO NOT use on forage legumes that have been treated with a residual herbicide in the previous 12 months.

Application Information:

Water Volumes:
Ground applications: 91 to 222 L per acre. Use 222 to 445 L per acre on potatoes.
Aerial applications: 18 L per acre.
Use the highest water volumes when crop canopy is heavy or if weed growth is dense.

Nozzles and Pressure: 20 to 30 psi (150 to 200 kPa) when using conventional Flat fan nozzle tips are recommended for proper coverage. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Best results under cloudy conditions or in evening. Shattering losses can increase if heavy winds, rain or hail occur after the crop has dried down.

Tank Mixes:

Herbicides: None registered.

Insecticides: None registered.

Fungicides: Fungicides may be added when applying *diquat* to potatoes for vine killing.

Fertilizers: None registered.

Restrictions:

Rainfall: Within 15 minutes may reduce effectiveness.

Re-entry: Leave 24 hours before entering treated fields.

Grazing: Crop residues remaining after harvest may be fed to livestock.

Preharvest Interval:
Fababean, Lentil: Wait 4 to 7 days to harvest.
Forage Legumes: DO NOT exceed 7 days.
Canola, Mustard: Wait 7 to 10 days; maximum 14.
Sunflowers: Wait 15 to 20 days.
Flax, Peas: When sample tests dry.

Re-cropping: No restrictions the year after application.

Aerial Application: May be applied by air in a minimum of 18 L per acre water volume.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Crops	Buffer Zones (metres†) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground	Potatoes	10	5	5
	Other crops under **Crops:** section	5	3	3
Winged aircraft	Potatoes	200	100	100
	Beans, Legume forage seed	150	80	90
Helicopter	Potatoes	125	65	80
	Beans, Legume forage seed	100	55	70

See page 36 for an explanation of the different habitats.

* **Buffer zones for ground applications can be reduced by** 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

When finished spraying *diquat*, rinse the sprayer out with clean water. Run through pump, lines and nozzles. Drain tank by spraying out on an untreated portion of a crop on which the product is registered, or by spraying on uncropped land. Refill sprayer with water and *Agral 90* at 0.6 L per 1,000 L **spray solution. Run the solution through** lines and boom. Spray out, then refill with clean water. **Leave equipment standing overnight, then drain water out.**

Refer to page 15 to 16 for additional information.

Hazard Rating:

◈ Warning - Poison

▽ Caution - May cause eye damage

Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Distinct

Herbicide Group

4 - dicamba

19 - diflufenzopyr

(Refer to page 45)

Company:

BASF Canada (PCP#25811)

Formulation:

20% diflufenzopyr and 50% dicamba, sodium salt formulated as a water dispersible granule.

Container size - 2 x 2.3 kg.

Crops and Staging:

Fallow and Post-Harvest applications

Corn - 2 to 6 leaf stage

Weeds, Rates and Staging:

Corn:

Distinct *applied post-emergent to weeds below at 115 grams per acre plus a non-ionic surfactant (see page 42) and UAN (liquid 28-0-0) will control:*

Biennial wormwood (2 to 8 leaf)

Canada thistle*

Cocklebur (6 leaf)

Kochia (up to 15 cm)***

Lady's-thumb

Lamb's-quarters

Ragweed (common, giant** (2 to 8 leaf))

Redroot pigweed

Sow-thistle, perennial** (2 to 10 leaf)

Tall waterhemp

Velvetleaf

Volunteer canola (up to 4 leaf)

Wild buckwheat

Fallow or post-harvest:
It is recommended that Distinct be tank-mixed with glyphosate and Merge adjuvant (200 mL per acre).

***Distinct* at 58 g per acre (40 acres per jug), as a tank mix with glyphosate, provides enhanced control of the following weeds:**

Dandelion*
Lamb's-quarters
Narrow-leaved hawk's-beard
Redroot Pigweed
Round-leaved mallow
Sowthistle, spiny annual
Wild buckwheat

***Distinct* at 115 g per acre (20 acres per jug) controls:**
Weeds listed above plus:

Biennial wormwood (2 to 8 leaf)
Canada thistle*
Cocklebur
Kochia (up to 15 cm)***
Lady's-thumb
Lamb's-quarters
Redroot pigweed
Ragweed, common
Sow-thistle, perennial**
Tall waterhemp
Velvetleaf
Volunteer canola (up to 4 leaf)
Wild buckwheat

* Top growth control only.

** Suppression only.

*** Including group 2 and 9 resistant biotypes.

A general guide to mixing can be found on page 14.

DO NOT exceed a maximum application rate of 115 g per acre of *Distinct* per season.

Application Information:

Water Volume: 20 to 80 L per acre. High water volumes are required for adequate coverage, particularly when weed densities are high or weed staging is large.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage a of ***ASABE coarse*** droplets. Use 50 mesh (or coarser) filter screens.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C or less are forecast within 3 days of application or when temperatures are expected to exceed +27°c on the day of application. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:
Fallow and Post-harvest:
Glyphosate (180 to 360 g ae/acre) - recommended

Corn: None registered in western Canada.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Restrictions:

Rainfall: Rain within 4 hours may reduce control.

Re-entry: Leave 12 hours before entering treated fields.

Grazing: DO NOT graze or cut as feed for 75 days.

Preharvest Interval: DO NOT apply within 120 days of harvesting corn.

Re-cropping: A plant back interval of 30 days is required for the planting of rotational crops. Consult BASF for further information on rotational cropping.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place above 5°C.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	15	15	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Distinct can cause injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use.

Use 'Method B' on page 15-16 to clean sprayers after using *Distinct*.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Dual II Magnum

Herbicide Group
15 - metolachlor
(Refer to page 45)

Company:

Syngenta Canada (PCP#25729)

Formulation:

915 g/L s-metolachlor formulated as an emulsifiable concentrate. Container size - 2 x 10 L.

Crops and Staging:

Pre-plant incorporated. In areas with good rainfall or under irrigation, *Dual II Magnum* may be applied as a pre-emergence surface treatment. When applied to the soil surface, after planting but prior to emergence, at least 0.5 inches of water (1.25 cm) is required within 10 days of application for proper activity. Refer to product label for more specific information on timing and rates of applications for each crop type.

Corn (field, sweet, silage)
Dry beans (white, kidney, and pinto)*
Potatoes
Soybeans
Sweet white lupins

* Beans should be planted at least 4 cm deep to avoid crop injury. Dry bean varieties vary in their tolerance to *Dual II Magnum*. Test a limited acreage on all new varieties first.

Weeds and Staging:

Pre-emergent and Pre-Plant Incorporated Treatments:
Apply prior to weed emergence.

American nightshade
Barnyard grass
Eastern black nightshade
Green foxtail
Old witch grass
Redroot pigweed*
Yellow foxtail
Yellow nutsedge**

* Suppression only.

** Pre-plant incorporated treatment only.

Rates:

0.47 to 0.7 L per acre (12 L treats 24 to 17 acres).

Use higher rates on heavy textured soils or when high populations of weeds are expected.

DO NOT apply to soils with less than 1% or more than 10% organic matter.

Make only one application per season.

Refer to product label for more specific information on timing and rates of applications for each crop type.

Application Information:

Water Volume: A minimum of 60 L per acre.

Pressure: 30 to 45 psi (200 to 300 kPa).

Nozzles: Use flat fan nozzles, 50 mesh screens.

Incorporation:

Apply to a firm seed bed free of large clods or lumps. If using tandem disks, set disks to work the soil at a depth of 4 inches (10 cm) and operate at a speed of 6 km/hr (4 mph). If using an S-tine cultivator, set the implement to work the soil to a depth of 4 inches (10 cm) and operate at a speed of 10 km/hr (6 mph). Incorporation equipment should include rolling or western harrows.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

A moderate rainfall or equivalent irrigation is required within 10 days to activate pre-emergent surface treatments. If rain does not occur, a shallow cultivation or use of a rotary hoe is necessary. Drought conditions that persist after any application may reduce annual grass control. On sandy soils, heavy rainfall following application may cause leaching of *Dual II Magnum*, resulting in reduced weed control.

Tank Mixes:

Herbicides:
In Corn: *AAtrex* in both PPI and pre-emergent applications.

In Soybeans: *Sencor*, and *glyphosate*, in both PPI and pre-emergent applications.

Fertilizers: May be applied with liquid fertilizer. May be impregnated onto dry bulk fertilizers (except nitrate fertilizers, superphosphate fertilizers or limestone).

Insecticides: None registered.

Note: The above mixes are those listed on the *Dual II Magnum* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: When applying as a pre-emergent surface treatment, 0.5 inches (1.25 cm) of rain or irrigation is required after application for proper activity.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze the treated immature crop or cut for hay. In corn, immature means before ear emergence.

Preharvest Interval: DO NOT harvest corn within 80 days of post-emergent application.

Re-cropping: In the year of treatment, seed only corn, soybeans, white beans, potatoes, snap beans, lima beans, processing peas, sweet white lupins, or (a minimum of 4.5 months after application) winter cereals. If *Dual II Magnum* has been applied in a tank mix with another product, consult those products' labels for additional re-cropping restrictions.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones: Leave a buffer zone of 29 meters between last spray swath and the edge of important wildlife habitats such as wetlands, sloughs and water bodies.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

◇ Warning – Eye Irritant

▽ Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

DyVel

Herbicide Group
4 - dicamba & MCPA
(Refer to page 45)

Company:

BASF Canada (PCP# 16545)

Formulation:

84 g/L of dicamba and 336 g/L of MCPA K+ formulated as a solution.

Container size - 10 L, 55 L, 110 L, 1000 L

Crops and Staging:

Spring wheat (including durum), barley or oats - 2 to 5 leaf stage.

Winter wheat - apply in spring when crop is 6 to 10 inches (15 to 25 cm) tall but before shot blade stage.

Note: Crop damage can occur if applications are made at other than the recommended crop stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled in the 2 to 4 leaf stage unless otherwise stated:

Burdock
Cleavers (suppression only)
Cocklebur
Corn spurry (2 to 3 leaf)
Cow cockle (2 to 3 leaf)
Flixweed
Hemp-nettle (2 to 3 leaf)
Kochia
Lamb's-quarters
Mustards (ball, hare's ear, Indian, tumble, wild, wormseed)
Pigweed (prostrate, redroot, Russian)
Ragweed (common, false, giant)
Russian thistle
Shepherd's-purse
Smartweed (green, lady's-thumb)
Stinkweed
Tartary buckwheat
Wild buckwheat
Wild radish
Volunteer canola (2 to 4 leaf)
Volunteer sunflowers

Top growth control:

Canada thistle
Perennial sow-thistle

Rate:

0.51 L per acre (one 10 L jug treats 19.7 acres).

Application Information:

Water Volume:
Ground: 40 L per acre.
Aerial: Minimum 8 L per acre

Nozzles and Pressure: Maximum 40 to 45 psi (275 to 310 kPa) when using conventional flat fan nozzles. To reduce the risk of drift damage to sensitive non-target crops when using conventional nozzles, 20 to 30 psi (150 to 200 kPa) **as well as higher water volumes are recommended. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure** designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

For best weed control, apply when temperature is between 10 and 25°C. DO NOT treat crops under stress from excessive moisture or drought. To avoid crop injury, DO NOT apply when temperature is expected to exceed 30°C, or when there is a risk of a severe drop in overnight temperature.

Tank Mixes:

None registered.

Note: No mixes are listed on the *DyVel* label with currently marketed products.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval may be up to 8 hours. Avoid applying this** product when heavy rain is forecast. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated crop or cut for hay within 30 days of application.

Preharvest Interval: Leave 60 days between application and harvest.

Re-cropping: No restrictions the year after treatment.

Aerial Application: May be applied by air.

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4
Fixed wing aircraft	1	0	60
Helicopter	1	0	50

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to "Method A" in the general sprayer cleaning section on page 15 to 16. If mixed with other pesticides, the cleaning method above should be combined with the method recommended for the tank mix partner if different from above.

Hazard Rating:

▽ Caution - Poison

For an explanation of the symbols used here see page 11.

DyVel DSp

Herbicide Group

4 - dicamba, 2,4-D & mecoprop

(Refer to page 45)

Company:

BASF Canada (PCP#27856)

Formulation:

110 g/L dicamba, 295 g/L 2,4-D amine and 80 g/L mecoprop-p formulated as a solution.

Container size - 10 L , 55 L, 100 L.

Crops, Rates and Staging:

CROP	STAGE	RATE	
		(L PER ACRE)	ACRES PER 10 L JUG
Spring wheat (including durum)	3 to 5 leaf	0.34 to 0.45	29 to 22
Barley	2 to 3 leaf	0.34	29
Winter wheat	Before crop is 12 inches (30 cm) tall in spring	0.34 to 0.45	29 to 22
Corn (field)** (DO NOT apply to sweet corn)	Before corn reaches 6 inches (15 cm) in height with the top leaf extended or by directed spray with drop nozzles once over 12 inches (30 cm).	0.34 to 0.45	29 to 22
Native range and permanent grass pasture*	Established	1.3	7.7
Fall stubble, fallow	Stage according to weed	0.45 to 0.71	22 to 14

* Legumes will be severely injured by this application.

** NOTE: Under environmental stress corn will become brittle for 2 weeks after application. In-field mechanical processes and strong winds may cause stalk lodging during that time.

Applications outside the recommended stage may result in crop injury.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

The low registered rate for each crop will control the following weeds at the 2 to 3 leaf stage unless otherwise indicated:

Annual smartweed (including lady's-thumb)
Annual sow-thistle
Cocklebur
Common ragweed
Corn spurry
Hedge bindweed
Knotweed
Kochia
Lamb's-quarters
Mustards (wild, ball, tall, wormseed, yellow)
Pigweed (prostrate, redroot)
Russian thistle
Stinkweed*
Volunteer canola (2 to 4 leaf, prior to bolting)
Volunteer tame buckwheat
Wild buckwheat

Use the high registered rate for each crop to control the following weeds:

Canada thistle (top growth only)***
Cleavers (1 to 2 whorls)**
Cow cockle
Field bindweed†
Velvetleaf
Flixweed*
Jerusalem artichoke
Round-leaved mallow**
Shepherd's-purse*
Tartary buckwheat

† Apply when actively flowering.

* Rosette stage in winter wheat.

** Suppression only.

*** Canada thistle should be treated when 6 to 8 inches (15 to 20 cm) of new growth is present after harvest and in the early bud stage in fallow.

Rates for Native Range and Pasture will control:

Alder
Bull thistle
Chicory
Goat's-beard
Poison ivy
Ragwort
Sheep laurel
White cockle

The high rate for each crop should be used for all weeds under adverse growing conditions, when weeds are at an advanced stage of growth or when weed densities are high. Guidelines are not provided for weed densities under light or heavy infestations. When in doubt as to the infestation level, use the high rate or contact the manufacturer.

NOTE: It is possible that poisonous plants such as ragworts, hemlocks and death camas could be more palatable to livestock after treatment with DyVel DSp. *Suitable precautions should be taken to avoid livestock access when such plants are present.*

Application Information:

Water Volume:

Cereals: Minimum 40 L per acre.

Corn: 81 to 142 L per acre.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** classification or larger droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crops under stress from excess moisture, drought or disease may suffer a setback when this herbicide is applied. DO NOT apply when temperature exceeds 27°C or when relative humidity is high. Stubble treatments for thistle control in fall should be made at least 2 weeks prior to killing frost.

DO NOT apply *DyVel DSp* at wind speed greater than 5 mph (8 km/hr).

Tank Mixes:

Herbicides:

In corn:

AAtrex Liquid (0.91 L/acre).

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *DyVel DSp* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval may be up to 8 hours. Contact manufac**turer for more information. DO NOT irrigate for 24 hours after application.

Re-entry: DO NOT enter fields for at least 12 hours for field corn and leave 14 days from application to hand harvest sweet corn .

Grazing: DO NOT harvest for livestock feed within 30 days of application. DO NOT permit lactating dairy animals to graze fields within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Pre-harvest Interval: Leave 30 days between application and harvest.

Re-cropping: No restrictions the year after treatment.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones: If there are sensitive plants within 400 m, apply only when there is a light breeze away from the sensitive area. DO NOT contaminate wetlands or water used for domestic or livestock consumption, irrigation or natural habitat.

Application method	**Buffer Zones (metres†) Required for the Protection of:**		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Cropland	1	1	5
Range and Pasture	1	1	10

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

No cleaning informaiton provided on the label. Refer to **'Method B' in** general sprayer cleaning section on page 15 to 16.

Hazard Rating:

☠ Warning - Poison

⚠ Warning - contains the allergen soy

For an explanation of the symbols used here see page 11.

Eclipse III

Herbicide Group
4 - clopyralid
9 - glyphosate
(Refer to page 45)

This product is a prepackaged tank mix of *Eclipse III A* (*Lontrel* page 234) and *Eclipse III B* (*Vantage Plus Max II* pages 195). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

Company:

Dow AgroSciences

Formulation:

***Eclipse III A* (PCP#29032):** 360 g/L clopyralid formulated as a solution.

***Eclipse III B* (PCP#29033):** 480 g/L glyphosate present as an dimethylamine (DMA) salt and formulated as a solution.

Container size -
Eclipse III A: 4.45 L jug
Eclipse III B: 2 x 7.5 L jugs

Crops and Staging:

Glyphosate tolerant canola varieties only in the 2 to 6 leaf stage. Some yellowing may occur when applied at the 4 to 6 leaf stage. This effect is temporary and will not influence crop growth, maturity or yield.

Weeds and Staging:

No staging is specified on the label.

The weeds controlled by glyphosate at 180 g ae per acre plus:

Annual broadleaf weeds:

Chickweed
Corn spurry
Cow cockle
Kochia
Night-flowering catchfly
Shepherd's-purse
Smartweed
Wild tomato
Volunteer canola*

Perennial weeds (season long control):

Canada thistle
Dandelion less than 15 cm diameter**
Dandelion greater than 15 cm diameter***
Perennial sow-thistle**
Quackgrass

* Not including glyphosate tolerant (Roundup Ready) varieties.
** Top growth only.
*** Suppression only.

Rates:

Eclipse III A: at 112 mL per acre

Eclipse III B: at 375 mL per acre

One case treats 40 acres.

To prepare spray solution, add *Eclipse III A* to the spray tank. Once it is half filled with water, add *Eclipse III B* as the remaining water is added to the tank.

Application Information:

Water Volume: 40 L per acre.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. DO NOT use with galvanized sprayer tanks since explosive hydrogen gas can be produced.

Restrictions:

Re-cropping: Wheat, oat, barley, rye (not underseeded to legumes such as alfalfa and clover), forage grasses, flax, **canola, mustard and field pea* can be grown the year after** application. Apply manure bedded with straw from treated crops only to the crops listed above excluding field pea.

**DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local Dow AgroSciences representative or retailer for more information before seeding field pea following drought conditions in the previous year.*

Aerial application: DO NOT apply by air.

Edge Granular

Herbicide Group
3 - ethalfluralin
(Refer to page 45)

Company:

Dow AgroSciences (PCP#20980)

Formulation:

5% ethalfluralin formulated as a granular.
Container size - 25 kg or 544 kg.

Crops and Staging:

Edge can be applied prior to seeding the following crops:

- Seedling alfalfa (seed production only)
- Canola
- Caraway
- Coriander
- Dry beans (white or kidney)
- Fababeans
- Lentils (fall application only)†
- Mustard (yellow only)
- Peas
- Safflower
- Soybeans
- Sunflowers

† See special instructions for lentils section below

Weeds and Staging:

For pre-emergent control of the following weeds:

Grasses:

- Barnyard grass
- Crabgrass
- Foxtail (green & yellow)
- Volunteer barley*
- Volunteer spring wheat*
- Wild oat*

Broadleaf Weeds:

- Cleavers*
- Chickweed
- Corn spurry
- Cow cockle
- Hemp-nettle*
- Kochia
- Lady's-thumb*
- Lamb's-quarters
- Nightshade*
- Prostrate pigweed
- Purslane
- Redroot pigweed
- Russian thistle*
- Wild buckwheat

* Suppression only.

Rates:

	RATE (KG PER ACRE)				
	LIGHT TEXTURED SOILS		MEDIUM TO HEAVY TEXTURED SOILS		
TIME OF APPLICATION	2-6% Organic Matter/Dark Brown-Black	6-15% Organic Matter Deep Black	2-4% Organic Matter Dark Brown	4-6% Organic Matter Black	6-15% Organic Matter Deep Black
Spring	6.9	8.9	6.9	8.9	8.9 - 11.3
Fall *	8.9	11.3	8.9	11.3	11.3

* To conserve crop residue, one incorporation may be completed in the fall and the second incorporation completed in the spring prior to planting.

DO NOT apply to peat soils, mineral soils containing less than 2 percent organic matter or soils containing greater than 15 percent organic matter. Application to eroded knolls or grey-wooded soils with highly variable texture or organic matter may result in reduced crop stand, delayed development or reduced yields in either the treated or rotational crop.

To reduce the possibility of injury to the treated crop, use good quality certified seed. Seed shallow into a warm, moist, firm seedbed using recommended agronomic practices that will promote rapid and even crop germination and emergence.

† Special instructions for lentils:
Registered for use on lentils for fall application only. One incorporation must be completed in the fall. Seeding depth is critical - DO NOT seed more than 1.5 inches (4 cm) deep. Avoid loose seedbeds and planting into cold soils.

Application Information:

Equipment: Apply using a calibrated granular applicator.

Incorporation: Two incorporations are required at right angles for thorough mixing. The first incorporation must be completed within 24 hours of application. Delay the second incorporation for at least three days after the first. When applying *Edge* in the fall, it is preferred that both incorporations be done in the fall. The second incorporation may be delayed until spring to conserve crop residues; however, both incorporations must be done to the same depth.

Incorporate with a tandem disc, discer or field cultivator (Vibrashank type). Cultivators should have 3 to 4 rows of sweeps spaced 8 inches apart and staggered so that no soil is left unturned. Set equipment to work at a depth of 3 to 4 inches (8 to 10 cm). Operate disc implements at 4 to 6 mph (7 to 10 km/hr), cultivators at 6 to 8 mph (10 to 13 km/hr).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crops stressed by cold weather, excessive moisture or drought may be injured by *Edge*. Dry soil conditions between application and emergence may result in decreased weed control.

Tank Mixes:

Not applicable.

Restrictions:

Rainfall: No effect once incorporated.

Grazing: DO NOT graze or cut treated crops for livestock feed prior to crop maturity.

Re-cropping: DO NOT grow sugar beets, oats, and small seeded annual grasses such as timothy, canaryseed and creeping red fescue in rotation following a crop treated with *Edge*. DO NOT seed wheat as a rotational crop onto land that has been treated with trifluralin and/or ethalfluralin at oilseed/special crop/barley rates for two consecutive crop years Thinning of crop may occur in areas that have received abnormally low amounts of precipitation or in crops that are emerging slowly.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen. DO NOT expose to prolonged sunlight or heat.

Buffer Zones: Toxic to fish and other aquatic organisms. DO NOT contaminate water bodies or wetland areas.

Sprayer Cleaning:

Not applicable.

Enforcer D

Herbicide Group

4 - fluroxypyr and 2,4-D

6 - bromoxynil

(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30690)

Formulation:

80 g/L fluroxypyr, 190 g/L bromoxynil and 240 g/L 2,4-D ester formulated as an emulsifiable concentrate.

Container size: 2 x 10 L, 120 L or 480 L.

Crops and Staging:

Spring wheat (including durum) and barley at the 4 leaf stage until the flag leaf is fully emerged.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply to emerged weed seedlings up to the 5 leaf stage unless otherwise indicated.

Weeds controlled at the 0.24 L per acre rate:

Broadleaf plantain
Cleavers
Common groundsel
Kochia (up to 5 cm tall)
Hemp-nettle
Knotweed
Lady's-thumb
Lamb's-quarters
Night-flowering catchfly
Shepherd's-purse
Stinkweed
Stork's-bill
Volunteer canola
Wild mustard

Weeds controlled at the 0.48 L per acre rate:
Weeds listed above plus:

Canada thistle (supression)
Dandelion
Field horsetail
Redroot pigweed
Round-leaved mallow
Russian thistle
Volunteer flax
Wild buckwheat

Application Information:

Water Volume: Minimum 20 to 40 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.

Nozzles and Pressure: Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Optimum activity is experienced between 12 to 24 °C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8 °C or above 27 °C. Frost 3 days before or after an application may reduce crop tolerance and weed control efficacy.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:
In spring wheat (including durum) and barley:
Tralkoxydim *(Nufarm Tralkoxydim* and *Liquid Achieve* only)
Fenoxaprop (Cordon or *Puma Advance* only)
Thifensulfuron/tribenuron (*Boost* only) - 2.7 g/acre.
In spring wheat (including durum) only:
Clodinafop (Signal or *Nufarm Clodinafop* only)
Simplicity
Varro

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Enforcer D* labels only. Nufarm Agriculture also supports the following mixes that are not on the *Enforcer D* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Everest 2.0, Traxos.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry Interval: DO NOT enter treated fields for 24 hours.

Grazing: DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals from treated feed 3 days before slaughter.

Pre-harvest Interval: DO NOT harvest within 60 days of application.

Re-cropping: Barley, canola, flax, forage grasses, lentil, mustard, oat, pea, rye and wheat can be seeded the following year or fields can be fallowed.

Aerial Application: DO NOT apply by air.

Storage: Store in a ventilated room above freezing. If frozen, allow container to warm and shake well before using.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only[*]	1	1	1

See page 36 for an explanation of the different habitats.

[*] Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

The manufacturer provides no recommendations on how to clean equipment used to apply this product. As a petroleum based emulsifiable concentrate, 'Method B' in the general section on sprayer cleaning on page 15-16 may be the most effective.

Hazard Rating:

Caution - Poison

Caution – Skin and Eye Irritant

For an explanation of the symbols used here see page 11.

Enforcer M

Herbicide Group

4 – fluroxypyr and MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30691)

Formulation:

80 g/L fluroxypyr, 200 g/L bromoxynil and 200 g/L MCPA ester formulated as an emulsifiable concentrate.

Container size: 2 x 10 L, 120 L or 480 L.

Crops and Staging:

Wheat (durum, spring) and barley - 2 leaf stage until the flag leaf is fully emerged.

Winter wheat - in spring once tillered until the flag leaf is fully emerged.

Canaryseed - from the 3 to 5 leaf stage. .

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply to emerged weeds up to the 6 leaf stage unless otherwise indicated.

Weeds controlled at the 0.25 L per acre (10 L treats 40 acres) rate:

Kochia (up to 5 cm tall)
Lamb's-quarters
Wild buckwheat *
Wild mustard

Weeds controlled at the 0.51 L per acre (10 L treats 20 acres) rate:

Weeds listed above plus:

American nightshade[†]
Bluebur[†]
Buckwheat (Tame, Tartary, Wild)
Canada thistle (top growth control only)
Chickweed
Cleavers (up to 6 whorls)
Cocklebur[†]
Common groundsel
Common ragweed
Cow cockle[†]
Flixweed[†]
Hemp-nettle
Mustard (ball[†], wild, wormseed)
Night-flowering catchfly[†]
Perennial sow thistle (top growth control only)
Redroot pigweed *
Russian thistle (< 5 cm tall)[†]
Scentless chamomile[†]
Shepherd's-purse[†]
Smartweed[†] (green, lady's-thumb, pale)
Stinkweed
Stork's-bill*
Velvetleaf[†]
Volunteer canola/rapeseed[†]
Volunteer flax
Volunteer sunflower[†]

* Suppression only.

[†] Up to 4 leaf stage only.

Application Information:

Water Volume: Minimum 20 to 40 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.

Nozzles and Pressure: Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Optimum activity is experienced between 12 to 24 °C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8 °C or above 27 °C. Frost 3 days before or after an application may reduce crop tolerance and weed control efficacy.

Tank Mixes:

Herbicides:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

In wheat (durum, spring, winter) and barley:
Tralkoxydim (Liquid Achieve and *Nufarm Tralkoxydim* only)
In wheat (spring and durum only) and barley:
Fenoxaprop (Cordon or *Puma Advance* only)
In spring wheat (including durum) only:
Clodinafop (Signal only)
Flucarbazone (Everest 2.0 only)
Simplicity
Varro

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Enforcer M* labels only. Nufarm Agriculture also supports the following mixes that are not on the *Enforcer M* label. Apply

mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Traxos*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval may be up to 8 hours. Contact manufacturer** for more information.

Re-Entry Interval: DO NOT enter treated fields for 24 hours.

Grazing: DO NOT graze or cut for livestock feed within 30 days of application. Withdraw meat animals from treated feed 3 days before slaughter.

Pre-harvest Interval: DO NOT harvest within 60 days of application.

Re-cropping: Barley, canola, flax, forage grasses, lentil, mustard, oat, pea, rye and wheat can be seeded the following year or fields can be fallowed.

Aerial Application: DO NOT apply by air.

Storage: Store in a ventilated room above freezing. If frozen, allow container to warm and shake well before using.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

The manufacturer provides no recommendations on how **to clean equipment used to apply this product. As a petroleum based emulsifiable concentrate, 'Method B' in the** general section on sprayer cleaning on page 15 to 16 may be the most effective.

Hazard Rating:

◈ Warning – Poison

▽ **Caution – Skin and Eye Irritant**

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Enforcer MSU

This product is the equivalent of a prepackaged mix of *Enforcer M* (page 156) and *thifensulfuron/tribenuron 75WDG* (*Boost* – see page 301). Information listed is restricted to Crops, Weeds and Rates. For other detailed information on the component products see the product pages listed for the components.

Herbicide Group
2 – thifensulfuron/tribenuron
4 – fluroxypyr and MCPA
6 - bromoxynil
(Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

The *Enforcer MSU* package has two components:

Enforcer M **(PCP#30691):** 80 g/L fluroxypyr, 200 g/L bromoxynil and 200 g/L MCPA ester formulated as an emulsifiable concentrate.

Container size – 2 x 7.5 L

Boost **(PCP#30377):** 50% thifensulfuron and 25% tribenuron formulated as a water dispersible granule.

Container size – 108 g.

Crops and Staging:

Wheat (durum, spring) and barley - 2 leaf up until the flag leaf is fully emerged.

Winter wheat – in spring from fully tillered up until the flag leaf is fully emerged.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled by the component products plus

Narrow leaved hawk's beard (suppression)

Rates:

Enforcer M: 375 mL per acre
Boost: 2.71 g per acre
(One case treats 40 acres)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Nufarm Agriculture also supports the following mixes that are not on the *Enforcer M* and *Boost* labels. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Traxos*

See component products for more information on restrictions, application details and handling. Use the most limiting restrictions across all components for the mix.

Eptam 8-E

Herbicide Group
8 - EPTC
(Refer to page 45)

Company:

Gowan Canada (PCP#11284)

Formulation:

800 g / L of EPTC formulated as an emulsifiable concentrate. Container size - 10 L, 1000 L

Caution:

The level of weed control may be reduced where *Eptam 8-E* is used on soils that have been treated with *Eptam 8-E* the previous growing season. It is expected that the reduction in control will be greater where *Eptam 8-E* have been used repeatedly for 2 or more years.

Crops, Rates and Staging:

Eptam 8-E is applied as a preplant incorporated treatment prior to seeding the following crops:

CROP	RATE (L/ACRE)	ACRES TREATED PER 10 L CONTAINER
Dry beans	1.72 to 2.23	5.8 to 4.5
Alfalfa, Bird's-foot trefoil Cicer milk-vetch** Sweet clover** Sunflowers*	1.72	5.8
Potatoes	1.72 to 3.44	5.8 to 2.9
Flax*	1.42 to 1.72	7.0 to 5.8

* May also be applied in late fall prior to freeze-up
** Seed production only

NOTE: The use of *Eptam 8-E* on flax is not recommended in Saskatchewan because of the risk of crop injury.

Where a rate range appears, use the lower rate on light textured soils and the higher rate on heavy textured soils. DO NOT use on soils with less than 3 percent organic matter or more than 15 percent organic matter.

Weeds and Staging:

Must be applied prior to the emergence of the following weeds. Emerged weeds will not be controlled.

Barnyard grass
Chickweed*
Corn spurry*
Green foxtail
Hairy nightshade*
Henbit *
Lamb's-quarters*
Nettleleaf goosefoot*
Pigweed (prostrate, redroot, tumble)*
Purslane*
Quackgrass (suppression)**
Volunteer cereals (wheat, barley, oats)
Wild oat
Yellow foxtail
Yellow nutsedge**

* Will be controlled only if treatment is made when conditions are favourable for germination and growth.

** Roots of perennial weeds must be thoroughly chopped prior to application.

Application Information:

Carrier Volume: Minimum of 40 L per acre of water or liquid fertilizer (see label for liquid fertilizer compatibility).

Pressure: 30 to 40 psi (200 to 275 kPa).

Equipment and Nozzles: Since *Eptam 8-E* is highly volatile, the product must be incorporated immediately. This is best accomplished by mounting spraying equipment directly onto the incorporation equipment (tandem disks, field cultivators on light soil).

May also be applied to cleanly cultivated soil for potatoes, by metering into the irrigation water to achieve the recommended rate per acre ("herbigation" or "chemigation"). See label for detailed instructions.

Incorporation: All growth and stubble should be thoroughly worked into the soil before treatment. Apply to a dry soil surface. Incorporate immediately after application preferably during the spraying operation as *Eptam 8-E* is volatile. Set disc and cultivator implements to cut to a depth of 4 to 6 inches (10 to 15 cm). A second operation at a right angle to the first is required. The disc or cultivator must be followed with a harrow or other levelling device that extends beyond the width of the implement. Speeds in excess of 5 mph (8 km/h) will result in excessive pulverization and crop residue destruction leaving the field susceptible to erosion. The maximum recommended tillage depth is 4 inches (10 cm).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop injury can occur if stressful environmental conditions (cold, wet soils, drought or excessive heat) prevail after seeding. To minimize crop injury, delay seeding 10 days if these conditions prevail at the time of application, or select an alternative product. Very cold or dry soil conditions during weed emergence will reduce control.

Tank Mixes:

Herbicides:
Dry beans (white and red kidney only): **Liquid formulations** of *Treflan* and *Rival.*

Insecticides: DO NOT tank mix with insecticides.

Fungicides: None registered.

Fertilizers: May be mixed with liquid fertilizer.
Compatibility test should be conducted according to instructions on the herbicide label.
Dry bulk fertilizers, except nitrate fertilizers, may be impregnated or coated with *Eptam 8-E.* The impregnated fertilizer should be spread uniformly onto the field using a double overlap pattern immediately after impregnation. The impregnated fertilizer must be applied to the field when the **soil surface is dry to at least 1/2 inch (1.5 cm) depth. The first** incorporation must be done immediately after application.

Note: The above mixes are those listed on the *Eptam 8-E* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No effect once incorporated. DO NOT apply prior to pre-irrigation.

Re-entry: DO NOT enter treated fields for 24 hours.

Grazing: DO NOT graze or feed treated crops to livestock in the year of application.

Re-cropping: Will not injure crops the year after spring application.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones: DO NOT apply within 15 m of fish bearing waters or wildlife habitat.

Soil Type: DO NOT use on soils with less than 3 percent organic matter as crop injury will result.

Sprayer Cleaning:

Refer to page 15 to 16.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Escort

Herbicide Group

2 - metsulfuron

(Refer to page 45)

Company:

Bayer CropScience (PCP#23005)

Formulation:

60% metsulfuron methyl formulated as a water dispersible granule.

Container size - 0.25 kg.

Crops and Staging:

Pasture, rough turf, and rangeland - No stage restrictions.

Weeds, Rates and Staging:

For seedling weeds apply to young plants up to 4 inches (10 cm) tall or wide. For established non-woody plants (biennial or perennial) apply up to the early bud stage. For western snowberry, wild rose and other woody species, apply between mid-June and mid-August after the brush has leafed out, but before the leaves begin to turn their fall colours.

RATE	WEEDS CONTROLLED	
8 g/acre	Canada thistle* Dandelion* Russian thistle Sow-thistle*	Common tansy Scentless chamomile Sweet clover
10 g/acre	***Above weeds plus:*** Western snowberry	
12 g/acre	***Above weeds plus:*** Wild rose	 Dandelion
40 g/acre**	Balsam poplar	Willow
60 g/acre**	Cherry	Trembling aspen

At all rates add *Agral 90, Agsurf II*, or *Citowett* at 0.2 L per 100 L of spray solution.

* Suppression only.

** Rangeland only. See label for detailed application instructions.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information

Water Volume: 40 to 91 L per acre for weedy growth and up to 809 L per acre applied to the point of run-off for woody species. See the label for details.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply during periods of intense rainfall or to soil saturated with water. Warm, moist conditions following treatment enhance the activity of *Escort*, while cold, dry conditions may reduce or delay activity. Brush hardened off by cold weather and drought stress may not be controlled.

Tank Mixes:

Herbicides:
2,4-D amine or ester (371 g ae/acre) plus surfactant.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry: DO NOT re-enter treated fields for 12 hours.

Grazing: May be grazed by cattle on the day of treatment.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Rate (g/acre)	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat**
	Less than 1 m	Greater than 1 m	
8 to 12	1	1	10
40	2	1	35
60	3	1	45

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Terrestrial buffers are not required for transport and utility rights of way

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

Escort can cause severe injury to sensitive crops at very low concentrations. Use 'Method A' on pages 15 to 16 to clean sprayers immediately after using Escort.

Hazard Rating:

▽ Caution - Eye Irritant

For an explanation of the symbols used here see page 11.

Everest GBX

Herbicide Group

2 - flucarbazone
4 - fluroxypyr
(Refer to page 45)

Company:

Arysta LifeScience Canada

Formulation:

***Everest 2.0* (PCP#30342):** 397 g/L **flucarbazone formulated** as a suspension concentrate.
Container size - 1.937 L container

***GBX* (PCP#29958):** 333 g a.e./L of **fluroxypyr formulated** as an emulsifiable concentrate.
Container size - 2 x 5 L

Crops and Staging:

Spring wheat (including durum) with 2 leaf to a maximum of 4 main stem leaves plus 2 tillers (6 total leaves).

Tank mix options are listed in the tank mix section.

Note: Some of the tank mix partners may have more limiting staging than Everest GBX. When tank mixing use the most restrictive application stage or injury may result.

Weeds, Rates and Staging:

RATE (Acres per case)	WEEDS
100	**Weeds controlled by *Everest 2.0* at 19.4 mL per acre plus:** Cleavers from the 1 to 4 whorl stage Kochia (2 to 8 leaf stage) (2,4-D ester mix only) Wild buckwheat (1 to 4 leaf stage)
80	**Weeds controlled by *Everest 2.0* at 24.3 mL per acre plus:** Kochia (2 to 8 leaf stage) Volunteer flax (1 to 12 cm) Stork's-bill (Suppression only) (1 to 8 leaf)

As well as any of the weeds controlled by the tank mix partner.

This product **MUST also be mixed** with one of either *2,4-D Ester, MCPA Ester* or *Curtail M.*

Add non-ionic surfactant (such as ***Agral 90, Agsurf***) **at** 0.25 L **per** 100 L **of spray solution.**

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:

*Note: All mixes **must** be applied with a registered surfactant unless otherwise indicated. Only one registered surfactant is required.*

In spring wheat (including durum):
2,4-D Amine or *Ester* **at recommended rates up to** 170 g **ae/** acre (see 2,4-D page for product amounts)

In spring wheat (NOT including durum):
2,4-D Amine or *Ester* **at recommended rates up to** 227 g **ae/** acre (see 2,4-D page for product amounts)
Curtail M (0.6 **to** 0.8 **L/acre)**
MCPA Amine or *Ester* **at recommended rates up to** 0.38 **L/** acre (600 **g/L formulation)**

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Everest GBX* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-Entry: Wait at least 12 hours before re-entering treated fields.

Grazing: DO NOT graze treated fields. Mature grain or straw may be fed to livestock.

Preharvest: Leave at least 80 days from application to harvest.

Re-cropping Interval: Follow the chart below for *Everest GBX* components only. If mixing with *Curtail M* as well check for any additional recropping restrictions on the *Curtail M* page:

Soil Zones and Rotational Crops		
Grey-Wooded	**Black and dark brown**	**Brown**
Spring Wheat Barley Canola (all varieties) Field Pea*	Wheat (Spring & durum) Barley Canola (all varieties) Field Pea* Flax	Spring Wheat

* Field pea may be grown the year following *Everest GBX* application in fields where precipitation has been equal to or above the 10 year average during the growing season, and where organic matter content is above 4%, and pH is below 7.5. The company suggests a minimum of 100 mm (4 inches) of rain is needed in the 60 days following application for adequate breakdown to take place.

NOTE: Other rotational crops may also be affected if rainfall is less than the 10 year average for the area. Soils in the grey wooded, black and dark brown soil zones with a combination of low organic matter (less than 2%), light textured soils or high pH (greater than 7.5) (i.e. eroded knolls, sandy soils) may result in delayed growth and development in rotational crops.

Aerial Application: DO NOT apply by air.

Storage: Store in closed original container in a cool, dry area away from fertilizers, food or feed. DO NOT freeze. If frozen bring *Everest GBX* component to room temperature and agitate (shake) before use. The *GBX* component is combustible – DO NOT store near heat or open flame.

Buffer Zones: Leave at least 20 m from the downwind edge of the spray swath to sensitive upland plants like shelterbelts and woodlots and at least 35 m to water sources or wetland habitats. Avoid drift onto sensitive crops like canola and tame oat. DO NOT mix or load within 10 m of water sources or wetland habitats.

Sprayer Cleaning:

Everest GBX residues in the spray tank can cause severe injury to sensitive crops at very low concentrations. Sprayers should be cleaned out immediately before using another product. Follow 'Method A' on page 15 to 16 to clean sprayers immediately after Everest GBX application. Since the GBX component is petroleum based, it is recommended that detergent as indicated in 'Method B' also be included in the cleaning process.

Hazard Rating:

Everest Component:

◇ Warning – Contains the Allergen Milk

GBX component:

☠ Danger – Poison

◇ Warning – Eye and Skin Irritant

▽ Caution – Skin Irritant

▼ Caution – Flamable

For an explanation of the symbols used here see page 11.

Express FX

Herbicide Group
2 – tribenuron
4 – dicamba
(Refer to page 45)

This product is a prepackaged tank mix of *Express SG* (see tribenuron - page 317) and the equivalent of *dicamba 480* (page 135). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

E.I. DuPont Canada

Formulation:

The *Express FX* package contains the following components:

***Express SG* (PCP#28262):** 50% tribenuron formulated as a soluble granule.

Container size: 486 g

***Dupont Dicamba L* (PCP#31536):** 480g/L dicamba dimethylamine salt formulated as a solution

Container size: 4.7 L.

Crops and Staging:

Prior to seeding the following crops:

Spring wheat
Durum wheat
Barley

Rates:

Express SG: 6 g/acre
Dupont Dicamba L: 58.7mL/acre
One case treats 80 acres

No adjuvant is required when mixing with glyphosate at 180 gae per acre or more.

Weeds and Staging:

Weeds controlled by the pressed use of *Express SG* and glyphosate when mixed with glyphosate plus:

Kochia resistant to Group 2 herbicides and glyphosate

Tank Mixes:

Herbicides:
Glyphosate (180 g ae per acre - see glyphosate page 195)

See component products for more information on restrictions, application details and handling. Use the most limiting restrictions across all components for the mix.

Express Pro

(this referring text to be removed in the 2018 edition)

See Tribenuron/Metsulfuron on page 320.

Fenoxaprop

Herbicide Group
1 - fenoxaprop
(Refer to page 45)

Company:

ADAMA Canada (*Bengal WB*)
Bayer CropScience (*Puma Advance*)
Farmers of North America (*HellCat*)
FMC of Canada (*Cougar*)
IPCO (*Vigil WB*)
Loveland Products Canada (*WildCat*)
Nufarm Agriculture (*Cordon*)

Formulation:

Bengal WB **(PCP#30843),** ***Cordon*** **(PCP#29494),** ***Cougar*** **(PCP#30473),** ***HellCat*** **(PCP#30055),** ***Vigil WB*** **(PCP#30844),** ***WildCat*** **(PCP#29151):**
120 g/L fenoxaprop-p-ethyl formulated as an emulsifiable concentrate.
Container size* - 6.2 L, 12.4L, 18.6 L, 99.3L, 312L.

Puma Advance **(PCP#29615):** 90 g/L fenoxaprop-p-ethyl. Container size - 8.25L, 123.75L, 412.5L.

* Check with individual suppliers for the container sizes they have available.

Crops and Staging:

Application beyond the maximum rates provided below may result in crop injury.

CROP	STAGE
Spring wheat (including durum), Barley[†]	1 to 6 leaves on the main stem plus 3 tillers
Barley[††]	1 to 5 leaves on the main stem plus 2 tillers
Perennial ryegrass for seed production only[*] (seedling or established[†])	2 to 4 leaves
Meadow bromegrass (seedling or established) (forage or seed production)[**]	

[†] ***Puma Advance*** **only.** Late application of other products could result in injury to barley.

[††] ***Bengal WB, Cordon, HellCat, Vigil WB,*** **or** ***WildCat*** **only.** Apply to barley only when tank mixed with a registered broadleaf product. *NOTE: Application of other* fenoxaprop *products to barley can result in crop injury.*

[*] Perennial ryegrass with ***Bengal WB, Cordon, Cougar, Vigil WB*** or ***WildCat*** by ground only.

[**] Meadow bromegrass with ***Puma Advance*** by ground only.

NOTE: Since the uses on forage grasses were registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. ***Those who apply this use do so at their own risk.***

Durum wheat, forage grasses and barley may experience some initial, temporary stunting and yellowing that rarely results in yield loss. Injury is more likely under stress conditions (see "Effect of Growing Conditions" section).

Treatment at the 3 to 4 leaf stage of cereal crops and weeds will maximize crop tolerance and weed control. Temporary crop injury such as shortening or discolouration may be observed after application. Such injury is more likely to occur in barley and also when *fenoxaprop* is applied outside recommended stages.

Application Information:

Water Volume:
Ground application: 23 to 45 L per acre. Use higher water volumes for dense canopies.
Aerial application: A minimum of 14 L per acre.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles. Angle nozzles forward at 45° to improve contact with vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE medium*** droplets or larger.

DO NOT use flood jet nozzles, controlled droplet application equipment or Spra-foil equipment.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply *fenoxaprop* 2 to 3 days prior to, or following, temperatures of 3°C or lower as crop injury may occur. Under stressful conditions (hot/dry, water logging, disease or insect damage) or heavy crop canopy, early application will improve weed control.

DO NOT apply by air when both the temperature is greater than 25°C and the relative humidity is less than 30%.

Weeds, Rates and Staging:

Apply from the 1 to 6 leaf stage up to emergence of 3rd tiller of the weeds below. Apply at the 3 to 4 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering. DO NOT apply *fenoxaprop* or products containing *fenoxaprop* to a crop more than once per year.

WEEDS	RATE (mL/ACRE)		RATE (ACRES PER PACKAGE†)
	Puma Advance	120 g/L forms	
Green foxtail only	206	*156*	80
Low wild oat infestations*	360	271	46
Moderate-heavy wild oat infestations, barnyard grass, green and yellow foxtail	413	312	40

† Based on 12.4 L for 120g/L formulations and 16.5 L for *Puma Advance.*

* Low wild oat rate for use on WHEAT AND DURUM ONLY, and when applied alone and NOT in a tank-mix. NOT for use with perennial ryegrass or meadow bromegrass.

Tank Mixes:

Herbicides:

DO NOT apply *Bengal WB, Cordon, Vigil WB* or *WildCat* in **barley without a broadleaf herbicide mix. ALWAYS tank** mix with a registered broadleaf herbicide.

2,4-D Ester (170 g ae/acre† - see 2,4-D page for product rates)

Ally (2 to 3 g/acre)†
Attain XC (label rates)††
Bromoxynil/2,4-D ester (label rate)Δ
Bromoxynil/MCPA ester (label rate)Δ
Curtail M (0.6 to 0.8 L/acre)
Dichlorprop/2,4-D (label rate)Δ
Estaprop XT (label rates)†††
DyVel (0.5 L/acre)**
DyVel DSp (0.45 L/acre)*** ΔΔ
Infinity (0.33 L/acre)ΔΔΔ
*Lontrel 360**** (0.17 L/acre)
*Lontrel 360**** (0.17 L/acre) + *MCPA 500 Ester* (0.34 L/acre)*
*Lontrel 360**** (0.112 L/acre) + *MCPA 500 Ester* (0.34 to 0.45 L/ acre)*
MCPA Amine or Ester (0.28 L/acre) (600 g ai/L formulation)
Mecoprop-p*** (2.2 to 2.8 L/acre)*Δ
Prestige XC (label rates)††
Refine SG (12 g/acre)††
Refine SG (12 g/acre) + MCPA (rates above)††
Refine SG (4 g/acre)+ Buctril M (0.4 L/acre)††
Spectrum (20 acres/case rate)**†
Triton C (label rate)ΔΔΔ
Trophy (20 acres per case)*††

† All products except *HellCat.*
†† *Puma Advance* and *Cougar* *** only.
††† *Cordon* and *Cougar* only.
Δ Manufacturers may only support mixes with specific brands. Contact the manufacturers for more information.
ΔΔ *Puma Advance, Cordon* and *Cougar* only.
ΔΔΔ *Puma Advance* only.
* Use only at the high rate of fenoxaprop.
** Use only at the green foxtail rate of fenoxaprop.
*** Use in wheat only

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *fenoxaprop* label only.

***Fenoxaprop* manufacturers may also support mixes with pesticides that are not on the *fenoxaprop* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Leave an interval of 7 days prior to application or 4 days after application of *fenoxaprop,* when applying any pesticide that is not registered as a tank mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT re-enter treated fields for 12 hours.

Grazing: DO NOT graze or cut cereal crops or meadow bromegrass for hay, within 25 days of application. DO NOT graze or cut perennial ryegrass crop for hay within 65 days of application.

Preharvest Interval: DO NOT harvest within 65 days of application.

Re-cropping: No restrictions in the year after application. Only one application may be made per year.

Aerial Application: May be applied by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground*	3	10
Aerial	3	33

See page 36 for an explanation of the different habitats.

* **These distances can be reduced by 30% using cones** on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Caution – Poison.

Cougar, HellCat* and *WildCat:

Warning – **Eye and Skin Irritant.**

Bengal:

Danger – Eye and Skin Irritant

All:

Warning – Contains the allergen soy

For an explanation of the symbols used here see page 11.

Flexstar GT*

***(For use only in the Red River Valley of Manitoba)**

Herbicide Group
9 – glyphosate
14 – fomesafen
(Refer to page 45)

Company:

Syngenta Canada (PCP#30412)

Formulation:

67 g/L fomesafen and 271 g/L glyphosate formulated as a solution.

Container size: 2x10 L and 450 L

Crops and Staging:

Flexstar GT may be applied as a pre seed burn down or as pre emergent to the crop of soybeans or as early post emergent on 1 to 2 trifoliate leaf stage of glyphosate tolerant soybeans only.

For use in the Red River Valley of Manitoba only.

Weeds and Staging:

Control of the following weeds at the cotyledon to 3 or 4 true leaf stage.

Grasses

Barnyard grass
Bromegrass (smooth)
Cattail (common)
Crabgrass (large, smooth)
Downy brome
Foxtail barley
Foxtail (green, yellow)
Persian darnel
Proso millet
Quackgrass
Rye, tame
Volunteer barley
Volunteer corn
Volunteer wheat
Wild oats
Yellow nutsedge

Broadleaf Weeds

Absinthe
Canada thistle
Chickweed, common
Cleavers
Clover, white
Cocklebur
Cow cockle
Curled dock
Dandelion
Field bindweed
Fleabane (Canada)
Flixweed
Hemp nettle
Horsetail
Knotweed (Japanese, prostrate)
Kochia
Lamb's-quarters
Milkweed (common)
Narrow leaved hawk's beard
Night flowering catchfly
Nightshade, Eastern black
Pigweed (redroot, smooth)
Prickly lettuce
Ragweed (common)
Round leaved mallow
Russian thistle
Shepherd's-purse
Smartweed (green, lady's-thumb)
Sow-thistle (annual, perennial)
Stinkweed
Stork's bill
Volunteer alfalfa
Volunteer canola (all varieties)
Volunteer flax
Wild buckwheat
Wild mustard
Wild tomato

Rates:

840 mL per acre.

DO NOT apply *FlexStar GT* or other products containing the ingredient fomesafen more than once in two consecutive years.

Add *Turbocharge* adjuvant at 0.25 L per 100 L spray solution only when weeds are under stress conditions and for larger weeds.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum of 60 to 80 L clean, clear water per acre. Higher spray volume is required for dense weed stands.

Pressure: 210 kPa (35 psi). Increase pressure to 420 kPa (70 psi) for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.

Nozzles: Use nozzles capable of delivering appropriate pressures and volumes.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Moisture is necessary to activate the herbicide for residual weed control. Dry weather following application of the herbicide may reduce effectiveness. Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Tank Mixes:

Herbicides:
Touchdown Total (0.28 to 1.0 L per acre)
Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 4 hours may reduce control.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Pre-harvest Interval: Leave at least 90 days from application to harvest.

Grazing: DO NOT graze treated crop or cut for hay. There is insufficient data to support such use.

Re-cropping: Winter wheat may be sown 4 months after application. Spring wheat, dry beans, soybeans and field corn may be grown the year following an application. DO NOT apply *Flexstar GT* to any field more often than once every 2 years. These re-cropping restrictions refer only to the Red River Valley of Manitoba. Use outside this is region is not registered as re-cropping options have not been determined.

Aerial Application: DO NOT apply by air.

Storage: Store above -10°C, in a dry place in original container, away from food or feed.

Buffer Zones: Leave a buffer zone of at least 15 m between the last spray swath and the edge of sensitive terrestrial areas such as shelterbelts, hedgerows and shrublands as well as aquatic areas such as ponds, streams, rivers, prairie potholes and sloughs. Do not apply when winds are greater than 15 km/hr.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

⚠ Warning - **Eye Irritant.**

For an explanation of the symbols used here see page 11.

Florasulam + 2,4-D

Herbicide Group
2 - florasulam
4 - 2,4-D
(Refer to page 45)

Company:

Dow AgroSciences (*Frontline 2,4-D*)
FMC of Canada (*Spitfire*)
Farmers of North America (*MPower Battlefront*)

Formulation:

The *Frontline 2,4-D XC* package has 2 components:
Frontline 2,4-D XC A **(PCP#30060):** 50 g/L florasulam formulated as a suspension concentrate
Frontline 2,4-D XC B **(PCP#30061):** 660 g/L 2,4-D LV ester formulated as an emulsifiable concentrate.
Container sizes:
Frontline 2,4-D XC A: 1.6 L.
Frontline 2,4-D XC B: 2 x 6.8 L
-or-
Spitfire (PCP#31252), ***MPower Battlefront*** (PCP#31325): 50 g/L florasulam formulated as a suspension concentrate.
Container size - 2 x 6.4L
(2,4-D Ester component purchased separately*)*

Crops and Staging:

Spring wheat (including durum) - 3rd leaf fully expanded to 6 leaf stage.

When mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

Bluebur
Burdock
Chickweed
Cleavers
Cocklebur
Dandelion*
Flixweed
Lamb's-quarters
Mustard (ball, wild)
Narrow-leaved hawk's-beard (up to 2 leaf)
Plantain
Prickly lettuce
Ragweed (common)
Redroot pigweed
Russian thistle
Shepherd's-purse
Smartweed (including lady's-thumb)
Sow-thistle (annual)
Stinkweed
Sunflower (annual)
Tartary buckwheat
Vetch
Volunteer canola†
Wild buckwheat
Wild radish

Broadleaf weeds suppressed:

Canada thistle (top growth control only)
Hemp-nettle
Perennial sow-thistle (top growth control only)

* Seedlings and overwintered rosettes
† Including all herbicide-tolerant canola varieties

Rates:

Frontline 2,4-D XC A: 40 mL per acre

Frontline 2,4-D XC B: 340 mL per acre.

One package treats 40 acres.

-or-

Spitfire or MPower Battlefront: 40 mL per acre. (2 x 6.4 L treats 320 acres)

-plus-

2,4-D Ester: 227 g ae per acre (purchased separately).

Note: Maximum one application of this product or other products containing florasulam within a two year time span.

Refer to the product label for complete mixing instructions for this product and its mixes.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 L per acre.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity of *florasulam + 2,4-D*. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur. Under conditions of low crop and high weed density, control may be reduced. Extreme growing conditions such as drought or near freezing temperature prior to, at, or following time of application may reduce weed control and increase the risk of crop injury at all stages of growth.

Tank Mixes:

Herbicides:

In spring wheat (including durum):

Assert 300 SC (0.65 L/acre) plus *Acidulate*

*Everest 2.0** (15 to 29 mL/acre) plus non-ionic surfactant

*Refer to the *Everest 2.0* product label for additional information on rates. Application of this tank mix to wheat under environmental stress may result in injury.

Insecticides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *florasulam + 2,4-D* label only.

***Floralsulam + 2,4-D* manufacturers may also support mixes with pesticides that are not on the product labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information. DO NOT apply excessive irrigation following application as product may leach.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application.

Preharvest Interval: Leave 60 days between application and harvesting mature crop.

Re-cropping: Wheat, barley, canola, chickpea*, corn*, dry beans*, flax*, lentil*, mustard* (brown, oriental, yellow, and oilseed quality *B. juncea* types), oats, peas, potato* (except seed potato), soybean* or sunflower* may be grown the year following an application.

* *Frontline 2,4 D* only.

Aerial Application: DO NOT apply by air.

Storage: Store in dry, heated area. If frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	5	5	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

◈ Warning - Poison

▽ May cause skin and eye irritation.

For an explanation of the symbols used here see page 11.

Florasulam + Curtail M

Herbicide Group
2 - florasulam
4 - clopyralid & MCPA
(Refer to page 45)

Company:

Dow AgroSciences (*Spectrum*)
FMC of Canada (*Spitfire*)
Farmers of North America (*MPower Battlefront*)

Formulation:

Each case of *Spectrum* contains 2 components:

***Spectrum A* (PCP#27031):** 50 g/L florasulam formulated as a suspension concentrate. Container size - 0.8 L

***Spectrum B* (PCP#27032):** 50 g/L clopyralid and 280 g/L of MCPA ester formulated as an emulsifiable concentrate. Container size - 12 L.

-or-

***Spitfire* (PCP#31252), *MPower Battlefront* (PCP#31325):** 50 g/L florasulam formulated as a suspension concentrate. Container Size - 2 x 6.4 L

(*Curtail M* component purchased separately)

Crops and Staging:

All Products:

Spring wheat (including durum), barley and oats in the 2 to 6 leaf stage.

Spectrum only:

Forage Grasses* (seedling and established) grown for seed production:
No staging indicated for forage grasses.

Bromegrass (meadow, smooth, hybrid)
Fescue (chewings, creeping red, hard, tall)
Perennial Ryegrass
Timothy
Wheatgrass (crested, intermediate)

* *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this product on forage grasses do so at their own risk.***

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

Canada thistle
Chickweed (common)
Cleavers
Dandelion**
Flixweed*
Hemp-nettle
Lamb's-quarters
Redroot pigweed
Shepherd's-purse
Smartweed
Sow-thistle (annual)
Sow-thistle (perennial)†
Stinkweed
Stork's-bill
Volunteer canola (all varieties)
Wild mustard
Wild buckwheat

Broadleaf weeds suppressed:
Dandelion***

* Spring seedlings only.
** Seedlings and overwintered rosettes < 15 cm.
*** Overwintered rosettes > 15 cm; mature plants.
† Top growth control only.

Rates:

Spectrum A: 40 mL per acre

Spectrum B: 600 mL per acre

(One case treats 20 acres.)

-or-

Spitfire or ***MPower Battlefront***: 40 mL per acre (one 6.4 L container treats 160 acres)
-plus-
Curtail M **(must be purchased separately):** 600 mL per acre
Note: Maximum one application of these products or other products containing florasulam within a two year time span.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 L per acre.

Nozzles & Pressure: Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity of *Spectrum*. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and regrowth may occur. Under conditions of low crop and high weed density, control may be reduced. Extreme growing conditions such as drought or near freezing temperature prior to, at, or following time of application, may increase the risk of crop injury at all stages of growth.

Tank Mixes:

Herbicides:
In spring wheat (including durum) and barley:
Assert (0.65 L / acre) plus *Acidulate*
*Everest 2.0** (15 to 29 mL / acre) plus non-ionic surfactant

*Refer to the *Everest 2.0* product label for additional information on rates. Application of this tank mix to wheat under environmental stress may result in injury.

In spring wheat (including durum) and winter wheat:
Simplicity (0.15 to 0.20 L / acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *florasulam + Curtail M* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry: DO NOT re-enter treated fields for 12 hours.

Grazing: DO NOT graze treated crop or cut for feed within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Preharvest: DO NOT apply within 60 days of harvest.

Re-cropping: Barley, canola, corn, field pea*, flax, oat, mustard (brown, oriental, and yellow) and wheat may be grown the year following an application or the field can be fallowed.

** DO NOT seed to field pea for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field pea grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field pea an additional 12 months (22 months following application). Contact your local Dow AgroSciences representative or retailer for more information before seeding field pea following drought conditions in the previous year.*

Aerial Application: DO NOT apply by air.

Storage: Store in dry, heated (greater than 5°C) area. *Spectrum A* will freeze at -10°C. If frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	5	5	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Handheld or backpack applications do not require a buffer.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning **on page 15 to 16. Check the cleanout requirements of** pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

Caution - Poison

May cause eye irritation

For an explanation of the symbols used here see page 11.

Florasulam + glyphosate

Herbicide Group
2 - florasulam
9 - glyphosate
(Refer to page 45)

Company:

Dow AgroSciences (*PrePass XC, PrePass Flex*)

ADAMA Canada (*Priority*)

FMC of Canada (*Spitfire*)

Farmers of North America (*MPower Battlefront*)

Loveland Products Canada (*Blitz*)

Formulation:

The *PrePass XC* package contains 2 components:
PrePass XC A **(PCP#29651):** 50 g/L **florasulam formulated** as a suspension concentrate.
Container size - 1.6 L (40 acre), 4 x 12 L (1200 acre).
PrePass XC B **(PCP#29652):** 480 g/L glyphosate DMA salt formulated as a solution.
Container size - 2 x 7.5 L (40 acre); 4 x 112.5 L or 450 L (1200 acre).

-or-

PrePass Flex **(PCP#31259):** 25% florasulam formulated as a water dispersible granule.
Container size - 8 x 0.65 kg (640 acres)

-or-

Priority **(PCP#30831)**, ***Spitfire*** **(PCP#31252)**, ***MPower Battlefront*** **(PCP#31325)**, ***Blitz*** **(PCP#31687):** 50 g/L florasulam formulated as a suspension concentrate.
Container size - 2 x 6.4L (320 acre)

PrePass Flex, Priority, Spitfire, MPower Battlefront and *Blitz* DO NOT come packaged with glyphosate. Glyphosate must be purchased separately.

Crops and Staging:

Florasulam + glyphosate can be applied either in the fall or in the spring prior to seeding spring wheat (including durum), barley or oats or as an initial fallow treatment.

PrePass XC or PrePass Flex may be applied in fall prior to seeding winter wheat.

Weeds and Staging:

Florasulam + glyphosate will control the following weeds:
Weeds controlled by glyphosate at the 180 g ae/acre rate plus enhanced control of the following weeds:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

Canada fleabane (up to 8 cm)†
Common chickweed
Cleavers
Cow cockle††
Dandelion (up to 30 cm across)
Flixweed†
Hemp-nettle
Kochia*
Lamb's-quarters
Narrow-leaved hawk's-beard (up to 8 cm)††
Ragweed (common) (up to 8 cm)†
Redroot pigweed
Russian thistle†
Scentless chamomile†
Shepherd's-purse
Stinkweed
Smartweed (including lady's-thumb)
Volunteer canola (all varieties)
Wild buckwheat (up to 5 leaf)
Wild mustard

Broadleaf weeds suppressed:

Annual sow-thistle
Perennial sow-thistle***

* **Note: Florasulam + glyphosate will not control glyphosate resistant kochia.**

** **Earlier applications provide better results.**

† *PrePass XC and PrePass Flex* only.

†† *PrePass XC, PrePass Flex, Priority* and *Blitz* only.

Rate:

PrePass XC A: 40 mL per acre.

-plus-

PrePass XC B: 375 mL per acre.

-or-

Prepass Flex: 8.1 g per acre.

-or-

Priority*, *Spitfire*, *MPower Battlefront **or** ***Blitz:*** 40 mL per acre.

-plus-

Glyphosate (purchased separately): 180 g ae per acre (see glyphosate page for product rates).

(See "Formulations:" section for package rates.)

Maximum one application of these products or other products containing florasulam within a two year time span.

Application Information:

Water Volume: 20 to 40 L per acre.

Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) **when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance.** Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Florasulam: Warm, moist growing conditions promote active weed growth and enhance activity. Weeds hardened **off by cold weather or drought stress may not be adequately** controlled or suppressed and re-growth may occur.

Glyphosate: **Best results are achieved when temperatures** are relatively warm, in bright sunshine and when weeds are actively growing. Frost that kills more than 40% of above ground tissue will reduce control. Heavy dust layer on leaves will also reduce control.

Tank Mixes:

PrePass XC: None registered.

PrePass Flex: **glyphosate IPA, DMA or K+ salt at 180 to 1020 g ae/acre.**

Priority*, *Spitfire*, *MPower Battlefront **or** ***Blitz*** must be **mixed with glyphosate IPA or DMA salt at 180 g ae/acre.**

Supported unlabelled mixes - Apply mixes according to the most restrictive use limitations for either product:

Dow AgroSciences supports the following mixes that are not on the *PrePass* label:

Herbicides: *2,4-D ester, MCPA ester, Vantage Plus Max II***

*** NOTE: Dow AgroSciences does not support the topping up of PrePass XC with other salts of glyphosate as they may have a negative reaction with the florasulam component. PrePass Flex may be topped up with any formulation of glyphosate, as indicated above.*

ADAMA supports the following mixes that are not on the Priority label.

Herbicides: glyphosate (all salts).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage. DO NOT apply if rainfall is forecast for the time of application. Contact manufacturer for more information. DO NOT apply excessive irrigation following application as product may leach.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated crop or cut for feed within 7 days of application.

Re-cropping: Spring wheat (including durum), barley and oat, may be seeded, or the field may be fallowed, after applications made in the spring prior to seeding, or the previous year after August 1. **Barley, canola, chickpeas*, dry beans*, field peas, flax*, lentils*, mustard* (brown, oriental, yellow and oilseed quality *B. juncea*) oat, soybeans*, sunflower* and wheat, may be grown following applications** made prior to August 1 of the previous season.

* *PrePass XC, PrePass Flex,* and *Priority* only.

Aerial Application: DO NOT apply by air.

Storage: Store in dry, heated area. DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70%** when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution - Poison

▽ Caution - Irritant, may cause eye irritation.

For an explanation of the symbols used here see page 11.

Florasulam + MCPA Ester

Herbicide Group
2 - florasulam
4 - MCPA
(Refer to page 45)

Company:

Dow AgroSciences (*Frontline XL*)

ADAMA Canada (*Topline*)

FMC of Canada (*Spitfire*)

Farmers of North America (*MPower Battlefront*)

Formulation:

Frontline XL **(PCP#28804):** 4 g/L **florasulam** and 280 g/L MCPA ester formulated as an emulsifiable concentrate. Container size - 2 x 10 L.

The *Topline* package contains two components:

Florasulam SC **(PCP#30814):** 50 g/L florasulam formulated as a suspension concentrate.

Checkmate MCPA Ester 600 **(PCP#27804):** 600 g/L MCPA Ester formulated as an emulsifiable concentrate.
Container size - *Florasulam SC:* 1.6 L; *MCPA Ester:* 9.33

Spitfire **(PCP#31252),** ***MPower Battlefront*** **(PCP#31325):** 50 g/L florasulam formulated as a suspension concentrate. (MCPA Ester component purchased separately)
Container size - 2 x 6.4L

Crops and Staging:

All Products:

Spring wheat (including durum), barley and oats in the 2 to 6 leaf stage.

Frontline XL **only:**

Seedling and established timothy for forage and seed production*:

Seedlings: from the 2 leaf fully expanded stage up to the flag leaf stage.

Established: no stage restrictions.

** NOTE - Since applications to timothy has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to timothy is at the risk of the user.***

When tank-mixing, always check the tankmix partner recommendations for additional staging restrictions.

Weeds and Staging:

Broadleaf weeds controlled at the 2 to 4 leaf stage:

Ball mustard
Burdock[**]
Chickweed
Cleavers
Cow cockle[††]
Flixweed[**]
Hemp-nettle[◊]
Lamb's-quarters
Prickly lettuce[**]
Ragweed (common)
Redroot pigweed[◊]
Russian pigweed[**]
Shepherd's-purse
Smartweed
Stinkweed
Sunflower (annual)[**]
Volunteer canola[*]
Wild mustard
Wild buckwheat

Broadleaf weeds suppressed:

Canada thistle[◊]
Dandelion[***◊]
Plantain[†]
Stork's-bill
Sow-thistle (annual)
Sow-thistle (perennial)[†]

[*] **including all herbicide-tolerant canola varieties**
[**] **up to the 4 leaf stage of development**
[***] **seedlings and overwintered rosettes less than 15 cm** (6 inches)
[◊] for improved control of this weed add an additional **47.5 mL per acre of** *MCPA LV600.*
[†] top growth control
[††] *Frontline XL and Priority* only.

Rate:

Frontline XL: 0.5 L **per acre**

-or-

Topline* (sold with *Checkmate MCPA 600 Ester*), *Spitfire or MPower Battlefront (MCPA ester* sold separately*):

Florasulam: 40 **mL per acre**

-plus-

MCPA 600 Ester: 0.23 **L per acre**

(One case of *Frontline XL* or *Topline* treats 40 acres. One case of *Spitfire* or *MPower Battlefront* treats 320 acres.)

Note: Maximum one application of these products or other products containing florasulam within a two year time span.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: A minimum of 40 **L per acre.**

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 **kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use** nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity of ***florasulam + MCPA ester***. Weeds hardened off by cold weather or drought stress may **not be adequately controlled or suppressed and re-growth may occur. Under conditions of low crop and high weed density, control may be reduced. Extreme growing conditions** such as drought or near freezing temperature prior to, at or following time of application may increase the risk of crop injury at all stages of growth.

Tank Mixes:

Herbicides:
In spring wheat (including durum) and barley only:
Assert (0.65 **L / acre) plus** *Acidulate.*
In spring wheat (including durum) only:
Simplicity **at** 0.2 **L / acre (no adjuvant required).**[†]

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

[*] **This tank mix may result in reduced levels of green foxtail** control.
[†] *Frontline XL* only.

Note: The above mixes are those listed on the *florasulam + MCPA ester* labels only.

Dow AgroSciences also supports the following mixes that are not on the *Frontline XL* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Clodinafop (Signal and NextStep)*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label: **required interval may be up to** 8 **hours. Contact manu**facturer for more information. DO NOT apply excessive irrigation following application as product has the potential to leach.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT allow lactating dairy animals to graze treated crops or cut for feed or hay within 7 days of application. Withdraw meat animals from treated feed 3 days prior to marketing. DO NOT graze timothy or cut for forage within 7 days of treatment.

Preharvest Interval: DO NOT apply within 60 days of harvest.

Re-cropping: Wheat, barley, canola, chickpea[*], corn[*], dry beans[*], flax[*], lentil[*], mustard[*] (brown, oriental, yellow and oilseed quality B. juncea types), oats, peas , potato[*] (except seed potato), soybean[*] or sunflower[*] may be grown the year following an application.

[*] *Frontline XL* only.

Aerial Application: DO NOT apply by air.

Storage: Store in dry, heated area. If frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	5	5	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 15 to 16. When mixing with other pesticides, combine the method above with the method recommended for the tank mix partner if different from above for thorough cleaning.

Hazard Rating:

Frontline XL:

◇ Warning – Potential skin sensitizer.

Florasulam SC:

▽ Caution – Poison.

MCPA 600 Ester:

◈ Warning – Poison

Both may cause eye and skin irritation irritation.

For an explanation of the symbols used here see page 11.

Florasulam/fluroxypyr + MCPA ester

Herbicide Group

2 - florasulam
4 - fluroxypyr, MCPA
(Refer to page 45)

Company:

ADAMA (*Outshine*)
Dow AgroSciences (*Stellar*)

Formulation:

Stellar A **(PCP#29286,** ***Outshine*** **(PCP#31646)):** 2.5 g/L **florasulam and** 100 g/L **fluroxypyr formulated as a suspension concentrate.**
Container size – 2 x 8 L.

Stellar B **(PCP#29165), MCPA 2 EH Ester 600 (PCP#31699):** 600 g/L **of MCPA ester formulated as an emulsifiable concentrate.**
Container size – 1 x 9.33 L.

Crops and Staging:

Barley, oat (*Stellar* only) **and spring wheat (including durum)** – 2 to 6 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Apply when weeds are at the 2 to 4 leaf stage.

Burdock†
Chickweed (Common)
Cleavers
Cocklebur†
Flixweed
Hemp nettle
Kochia
Lamb's-quarters
Plantain†
Prickly lettuce†
Ragweed
Pigweed (redroot, Russian†)
Shepherd's purse
Smartweed
Stinkweed†
Stork's-bill*
Sunflower (annual)
Vetch†
Volunteer canola
Volunteer flax
Wild buckwheat
Wild mustard
Wild radish†

* **Suppression only**

† *Stellar* only.

Rates:

Stellar A: 0.4 L per acre

Stellar B: 0.24 L per acre
(One case treats 40 acres)

Application Information:

Water Volume: Minimum 40 L per acre.

Nozzles & Pressure: For conventional flat fan nozzles use a pressure of 30 to 40 PSI (200 to 275 kPa). Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets. Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Tank Mixes:

Herbicides:
Barley, spring wheat, and durum* only*:
Assert (0.65 L / acre)

***Spring Wheat (including durum)* only:**
Everest 2.0 (19.4 to 29.1 mL / acre plus adjuvant - see flucarbazone)

Spring wheat (including durum) only:

Simplicity (0.15 to 0.20 L / acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Stellar* label only.

Manufacturers may also support the following mixes that are not on the *Florasulam/fluroxypyr + MCPA ester* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank:

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Preharvest: Leave 60 days between treatment and harvest.

Grazing: DO NOT graze or harvest for livestock feed within 7 days of treating the crop.

Recropping: Wheat, barley, oat, canola, and pea may be grown the season following application or the field may be fallowed. There are no recropping restrictions the second year after application.

Aerial Application: DO NOT apply by air.

Storage: May be frozen. If frozen, bring to room temperature and agitate before use. This product is combustible. DO NOT store near heat or open flame.

Buffer Zones: Leave 30 metres between the downwind edge of the boom and sensitive terrestrial habitats such as forested areas shelterbelts, woodlots, hedgerows, and shrub lands and 15 metres to sensitive freshwater habitats such as lakes, rivers, sloughs ponds, prairie potholes, creeks marshes streams reservoirs and wetlands.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. If mixed with another pesticide additional clean-out measures may be necessary.

Hazard Rating:

◈ Warning – Poison

◇ Warning – Eye and Skin Irritant.

▽ Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Flucarbazone

Herbicide Group
2 - flucarbazone
(Refer to page 45)

Company:

Arysta LifeScience Canada (*Everest 2.0*)
Syngenta Canada (*Sierra 2.0*)

Formulation:

Everest 2.0 **(PCP#30342)**, ***Sierra 2.0*** **(PCP#30430):** 397 g/L flucarbazone formulated as a suspension concentrate.
Container size - 1.94 L

Crops and Staging:

Spring application to wheat (spring, durum, winter) with 1 leaf to a maximum of 4 main stem leaves plus 2 tillers (6 total leaves).

Note: Several of the tank mix partners have more limiting staging than flucarbazone. When tank mixing use the most restrictive application state or injury may result.

Weeds, Rates and Staging:

Grass weeds: Maximum of 4 main stem leaves and 2 tillers

Broadleaf weeds: 2 to 6 leaf stage

WEED	RATE	
	mL PER ACRE	ACRES PER 1.937 L
Green foxtail*	14.6	134
Weeds listed above plus: Wild oat* (light infestations) (< 100 plants/m^2), volunteer oat, green smartweed, redroot pigweed*, shepherd's-purse*, volunteer canola*, wild mustard*, stinkweed* (2 to 9 leaf stage)	19.4	100
Weeds listed above plus: Wild oat* (heavy populations) (> 100 plants/m2, Japanese brome up to 4 leaf stage, both growing under ideal growing conditions	24.3	80
Weeds listed above plus: Wild oat* (heavy populations) (> 100 plants/m2), Japanese brome up to 4 leaf stage, both growing under poor growing conditions or when mixing with herbicides containing the a.i. dicamba (see pages 20-23)	29.1	67

Requires the addition of a non ionic surfactant (*Agral 90, Agsurf II, Liberate, ProSurf, Super Spreader, LI700*) at 0.25 L per 100 L of spray solution.

* **Will not control imidazolinone tolerant** (CLEARFIELD) canola volunteers or Group 2 resistant weed biotypes.

DO NOT **apply more than** 29.1 **mL per acre flucarbazone** per growing season.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:
Ground: 22.5 to 45 L per acre.
Aerial: 11 L per acre.

Nozzles and Pressure: Use 30 to 50 psi (200 to 345 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. Orienting nozzles at a 45 degree angle forward may improve coverage of vertical leaves (grasses).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop tolerance and weed control may be reduced if applications are made to plants growing under stress. Stress includes saturated or water-logged soil, drought, extreme temperatures, low fertility or visible disease symptoms at application. Adopting practices to increase crop vigour will improve crop tolerance.

Tank Mixes:

Herbicides:

Note:

- *All mixes must be applied with a registered surfactant unless otherwise indicated. Only one registered surfactant is required.*
- *All products below may be mixed at label rates with Flucarbazone unless otherwise indicated.*
- *Flucarbazone at all rates may be mixed with the products listed below unless otherwise indicated.*

In wheat (spring and durum) only:
2,4-D Amine or *Ester* at rates up to 170 g ae/acre*
Enforcer M
Florasulam + Curtail M (*Spectrum* only)*
Paradigm
Paradigm + MCPA Ester
Paradigm + Curtail M
Pixxaro

In wheat (spring and winter) only:
2,4-D Amine or *Ester* up to 227 g ae/acre
Bromoxynil/MCPA (*Buctril M/Logic M* only)
MCPA Amine or *Ester* at rates up to 0.38 L/acre (600 g/L formulation)
Thifensulfuron/tribenuron (*Refine SG/Deploy WDG* only)

In spring wheat (NOT including durum) only:
Bromoxynil (*Brotex 240/Pardner* only)
Bromoxynil/2,4-D (*Leader/Thumper* only)
Curtail M#*
Dicamba/mecoprop/MCPA (*Target* only)##†*
Dichorprop+2,4-D (*Estaprop/Dichlorprop-D* only)
DyVel##†
Florasulam + 2,4-D (*Frontline 2,4-D* only)
Florasulam + MCPA (*Frontline XL* only)*
Florasulam/Fluroxypyr+MCPA (*Stellar* only)#*
Fluroxypyr + 2,4-D (*Attain XC, OcTTain XL* only)#*
Fluroxypyr+MCPA (*Trophy* only)
Metsulfuron (*Ally only*) + *2,4-D Amine* or *Ester* up to rates above*
Optica Trio##*
Prestige XC#*
Thifensulfuron/Tribenuron (*Refine SG /Deploy* only) plus *2,4-D Amine* or *Ester* at rates above
Triton C

* Apply in 40 L/acre of water only.
† Wild oat control may be reduced with this mix.
# Tank mix only with the 24.3 to 29.1 mL/acre rate of *flucarbazone*.
## Tank mix only with the 29.1 mL/acre rate of *flucarbazone*.

Fertilizers: None.

Insecticides: None

Note: The above mixes are those listed on the *flucarbazone* labels only.

***Flucarbazone* manufacturers may also support mixes with pesticides that are not on the *flucarbazone* labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall within 1 hour of application may reduce control.

Re-entry: DO NOT re-enter treated area within 12 hours.

Grazing: DO NOT graze treated fields. Mature grain or straw may be fed to livestock.

Preharvest Interval: Leave at least 80 days from application to harvest

Re-cropping Interval: Follow the chart below:

Soil Zones and Rotational Crops			
Grey-Wooded	Black	Dark Brown	Brown
Spring Wheat Barley Canola (all varieties) Field Pea*	Spring Wheat Barley Canola (all varieties) Durum Wheat Field Pea* Flax Field Bean	Spring Wheat Barley Canola (all varieties) Durum Wheat Field Pea* Flax	Spring Wheat

* **Field pea may be grown the year following *flucarbazone* application in fields where precipitation has been equal to** or above the 10 year average during the growing season, and where organic matter content is above 4%, and pH is below 7.5. The company suggests a minimum of 100 mm (4 inches) of rain is needed in the 60 days following appli**cation for adequate breakdown to take place.**

NOTE: Other rotational crops may also be affected if rainfall is less than the 10 year average for the area. Soils in the grey wooded, black and dark brown soil zones with a combination of low organic matter (less than 2%), light textured soils or high pH (greater than 7.5) (i.e. eroded knolls, sandy soils) may result in delayed growth and development in rotational crops.

Aerial Application: May be applied by aircraft.

Storage: Store in closed original container in a cool, dry area away from fertilizers, food or feed. DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitat	Terrestrial habitat
Field sprayer*	35	20
Fixed wing aircraft	325	95
Helicopter	300	75

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. When mixing with other pesticides, combine the method above with cleanout methods for the tank mix partner.

Hazard Rating:

⚠ Warning – Contains the Allergen Milk

For an explanation of the symbols used here see page 11.

Flumioxazin (Chateau/Valtera)

Herbicide Group
14 - flumioxazin
(Refer to page 45)

Company:

Valent Canada, Inc. (Distributed by Nufarm Agriculture)

Formulation:

51.1% flumioxazin formulated as a water dispersible granule.

Container size -

Chateau **(PCP#29231)**: 1.13 kg

Valtera **(PCP#29230)**: 2.27 kg

Crops, Rates, and Staging:

Valtera:

In the fall just prior to freeze-up or spring prior to seeding or up to 3 days after seeding but prior to emergence of the following crops:

Soybeans - seed at least 1.5 inches (4 cm) deep
Field peas
Chickpeas

In the fall or in the spring at least 7 days prior to the direct seeding of:

Spring wheat (NOT including durum)*

* seed wheat at least 1 inch deep.

If weeds are emerged apply *Valtera* in a mix with glyphosate (see tank mix section).

Dry Bean Desiccation:

Apply 42.5 g per acre when beans are mature to dry green weed material. Add metholated seed oil at 1 L per acre.

Chateau:

Potatoes: Apply after hilling. A minimum of 2 inches (5 cm) of soil must cover the vegetative portion of the potato or crop injury may result.

Add *MSO* (methylated seed oil) *Concentrate* at 1 L per acre or *Nufarm Enhance Adjuvant* at 0.125 to 0.25 L per 100 L of spray solution.

Both Chateau and Valtera:

Bare Ground areas intended to be maintained weed free:

NOT for use in high traffic areas or powdery soils that will generate dust.

Apply products containing flumioxazin only once per growing season.

Weeds, Rates, and Staging:

Apply prior to crop and weed emergence.

WEEDS	Soil Type (all must have less than 5% organic matter)*	RATE (g/acre)
Chateau **- In potatoes only.**		
Suppression of: Canada fleabane Common ragweed Eastern black nightshade Kochia Lamb's-quarters Hairy nightshade Pigweed (green, redroot)	- Coarse or medium textured soils applied in spring	42.5
Valtera **- For soybeans only.**		
Control of the weeds above plus; Common chickweed Dandelion ***Suppression of:*** Green foxtail Volunteer canola (all varieties)	- Coarse textured soils - spring or fall applied	56.7
	- Medium textured soils - spring or fall applied	85**
Valtera **- For chickpea, field pea and spring wheat only.**		
Weeds as listed for Soybean above;	- Coarse textured soils - spring or fall applied - Medium textured soils*** - spring applied only	56.7
	- Medium textured soils - fall applied only	85
Valtera **- For bare ground areas only.**		
Extended control of all weeds above applied in the spring only	Coarse textured soils	113
	Medium textured soils	170

* DO NOT apply on soils with > 5% organic matter, or fine soils. Soils such as clay, clay loam, silty clay or silty clay loam are considered fine textured soils. DO NOT apply to soils composed of more than 90% sand and gravel.

** Injury may occur to soybean at this rate.

*** The duration of residual control may be reduced.

Spray within 6 hours of mixing.

Application Information:

Water Volume: Minimum application volume is not indicated on the label. Use appropriate water volumes to ensure good spray coverage.

Nozzles & Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

DO NOT perform any tillage operations after application otherwise weed control will be reduced.

When applied prior to seeding crops must be direct seeded with minimum disturbance systems.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Rainfall is required to activate *flumioxazin* in the soil. Crop injury may occur when soils are wet and cool following application or soils are poorly drained. Severe injury may occur with flooded soils. Newly emerging foliage can be temporarily injured by heavy rain splashing treated soil on leaves. Heavy crop residues may reduce weed control

Irrigation: If rainfall is not received after application, 5 to 10 mm of irrigation may be applied to improve weed control activity. DO NOT apply irrigation to wheat after emergence until the main head is fully emerged.

Tank Mixes:

Herbicides:
Soybean, and Bare Ground uses only:
Glyphosate (IPA or K salts) 486 g ae per acre.

Note: DO NOT mix when applying prior to soybean with *Dual II Magnum* or *Frontier/Outlook* herbicides or injury could occur.

Field pea only:
Glyphosate (IPA or K salts) 360 g ae per acre.

Dry Bean Desiccation only:
Glyphosate (IPA or K salts) at preharvest rates.

Fertilizers: None registered.

Fungicides: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rain or irrigation shortly after application is required for activation. If rainfall does not occur, irrigation with at least 5 mm of water is recommended before ground crack occurs.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Grazing: DO NOT graze or cut crops for livestock feed from treated fields.

Preharvest:
Desiccation: Leave 5 days between application and harvest. Leave 7 days to harvest if mixing with glyphosate.

Re-cropping: Soybeans, chickpea, field pea, and spring wheat may be seeded immediately after treatment or in the spring following a fall application. Winter wheat may be seeded 7 days after dry bean desiccation or in the fall following spring application. Alfalfa, barley, canola, field corn, sorghum, dry edible beans**, and sunflower may be seeded the season after spring application. All other crops require a minimum of 12 months and a successful bioassay prior to indicate safe seeding.

** *Note: Not all varieties of dry beans have been tested for recrop tolerance. Test new varieties of dry beans on a small area before attempting large acreages.*

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Crops	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Potato, Dry bean desiccation	2	1	5
Chickpea, field pea, soybean, Spring wheat	3	1	10
Bare Ground uses	5	2	25

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. See product label for further information.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Fluroxypyr + 2,4-D

Herbicide Group
4 - fluroxypyr & 2,4-D
(Refer to page 45)

Company:

Dow AgroSciences (*Attain XC, OcTTain XL*)
Nufarm Agriculture (*Flurox 2,4*)
ADAMA Canada (*Rush 24*)

Formulation:

The *Attain XC* package has 2 components:
***Attain XC A* (PCP#29463):** 333 g/L fluroxypyr
Container sizes - 5 L, 8 x 15 L.
***Attain XC B* (PCP#29264):** 660 g/L 2,4-D LV ester
Container sizes - 2 x 6.8 L, 4 x 82 L.
-or-

The *Flurox* 24 package has 2 components:
***Nufarm Fluroxypyr* (PCP#30194):** 180 g/L fluroxypyr.
Container size - 7.28 L.
***2,4-D Ester 700* (PCP#27820):** 660 g/L 2,4-D LV ester.
Container sizes - 10.3 L
-or-

The *Rush 24* package has 2 components:
***Fluroxypyr 180 EC* (PCP#30815):** 180 g/L fluroxypyr.
Container size - 9.6 L.
***Salvo 2,4-D Ester 700* (PCP#27818):** 660 g/L 2,4-D LV ester.
Container sizes - 9.8 L
-or-

***OcTTain XL*(PCP#30077):** 90 g/L fluroxypyr plus 360 g/L 2,4-D LV ester.
Container size - 2 x 9 L, 576 L

All products above are formulated as emulsifiable concentrates.

Crops and Staging:

Spring wheat (including durum), barley:
4 leaf up to the emergence of the flag leaf.

Winter wheat: Apply to winter wheat in the spring from the 3 tiller stage to just before the flag leaf stage. (*Attain XC* and *OcTTain XL* only)

Forage Grasses for seed production only*:
Seedling and established grasses at the 4 leaf up to the emergence of the flag leaf.

Bromegrass
(meadow, smooth)
Fescue (creeping red, tall)
Timothy
Wheatgrass
(crested, intermediate)

* *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Those who apply these uses do so at their own risk.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

The following weeds are controlled at the 2 to 4 leaf stage, unless otherwise specified:

***Attain XC A* 95 mL/acre plus *Attain XC B* 260 mL/acre or; Nufarm or ADAMA *Fluroxypyr 180* at 180 mL/acre plus *2,4-D Ester 700* at 260 mL/acre (*Flurox-24* treats 40 acres per case, *Rush 24* treats 52 acres per case) controls the following weeds:**

Bluebur
Burdock
Cleavers*
Clover (sweet)
Cocklebur*
Field horsetail**
Flixweed
Goat's-beard
Hoary cress**
Kochia
Lamb's-quarters
Mustards (except dog and tansy)
Plantain
Prickly lettuce
Ragweed
Shepherd's-purse
Stinkweed
Sunflower (annual)
Vetch
Volunteer canola
Wild radish
Wild mustard
Wild buckwheat (1-4 leaf with *Flurox-24* and 1 to 6 leaf with *Attain XC, Rush 24* and *OcTTain only*)

* 1 to 4 whorls with *Flurox-24* and *Rush 24*; 1 to 6 whorls with *Attain XC* only.

OcTTain XL at 0.45 L per acre (2 x 9 L treats 40 acres, 108 L treats 240 acres, 576 L treats 1280 acres) controls:
All weeds listed above plus:

Common chickweed (up to 8 cm or 3 inches)†
Cleavers (1 to 8 leaf)
Hemp-nettle (2 to 6 leaf)
Redroot pigweed†
Round-leaved mallow (1 to 6 leaf)
Sow-thistle (perennial)†**
Stork's-bill (1 to 8 leaf)
Volunteer flax (1 to 12 cm)

Attain XC A at 125 mL per acre plus _Attain XC B_ at 340 mL per acre (40 acres per case) or ;
Nufarm or ADAMA Fluroxypyr 180 at 240 mL per acre plus _2,4-D Ester 700_ at 340 mL per acre (_Flurox-24_ treats 30 acres per case , _Rush 24_ treats 40 acres per case) or;
OcTTain XL at 0.45 L per acre (one 2 x 9 L case treats 40 acres and 576 L treats 1280 acres) plus 2,4-D ester (LV700 at 81 mL/acre or LV600 at 95 mL/acre) controls:
All weeds listed above plus:

Annual sow-thistle†
Blue lettuce**
Canada thistle***†
Cleavers (1-8 whorls)Δ
Dandelion***
Docks
Dog mustard
Field bindweed**
Field peppergrass
Gumweed
Hairy galinsoga
Hedge bindweed
Hemp-nettle (2 to 6 leaf stage) ††
Kochia (2 to 8 leaf) ΔΔ
Leafy spurge**
Oak-leaved goosefoot
Perennial sow-thistle***†
Redroot pigweed
Russian thistle
Smartweed (including lady's-thumb)
Tansy mustard
Tartary buckwheat
Wild buckwheat (1 to 4 leaf, 1 to 8 leaf with *Attain XC, Rush 24,* and *OcTTain XL* only)

Δ *Attain XC* and *OcTTain XL* only.

ΔΔ *Attain XC, Flurox-24* and *Rush 24* only.

† Suppression only

†† Control with *OcTTain XL*, suppression with other products.

** **Top growth only**

*** **Spring rosettes only.**

Make only one application per year of any of these products or other products containing the same active ingredients.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:

Ground: *Attain XC* and *OcTTain XL* use 20 to 40 L per acre. All other uses minimum 40 L per acre.

Aerial: *Attain XC* and *OcTTain XL* only use 12 to 20 L per acre.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

The activity these products are influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought, heat or cold stress) or if extremely heavy infestations exist.

Tank Mixes:

Herbicides:
The following mixes may be used with each of the combinations above unless noted otherwise.

In spring wheat (including durum) and barley:
Tralkoxydim† (0.2 L / acre) plus adjuvant*
Assert (0.53 to 0.65 L / acre)

In spring wheat (including durum) only:
Clodinafop 240EC† (93 mL / acre) plus adjuvant†
Simplicity (0.15 to 0.20 L per acre)††

Insecticides: None registered.

Fungicides: None registered.

Fertilizer: None registered.

* Temporary crop injury or reduced wild oat control may occur with this tank mix.

† See product labels for specific brands registered.

†† Low rate of *Attain XC* or *OcTTain XL* without additional *2,4-D ester* only.

Note: The above mixes are those listed on the _fluroxypyr + 2,4-D product_ labels only.

Manufacturers may also support mixes between their products and other pesticides that are not on their labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall:
Attain XC* and *Flurox 2,4: Within 2 hours will reduce control.
OcTTain XL: Wet foliage at application will reduce control.

Re-entry: DO NOT re-enter treated area within 12 hours.

Grazing: DO NOT permit lactating dairy animals to graze cereal fields within 7 days of application. DO NOT harvest cereal crops for forage or cut hay within 30 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter.

DO NOT feed or cut forage grasses for hay

Preharvest Interval: Leave 60 days between application and harvest.

Re-cropping: Barley, canola, flax, forage grasses, lentils, mustard, oats, peas, rye, and wheat, may be grown the year after application. Alfalfa, corn, dry beans, potatoes, soybeans, and sunflowers may also be seeded the year following *Attain XC* and *OcTTain XL* only. There are no re-cropping restrictions the second year after application.

Aerial Application: *Attain XC* and *OcTTain XL* may be applied by air.

Storage: Avoid freezing. If frozen, bring to room temperature and agitate before use. These products are combustible. DO NOT store near heat or open flame.

Buffer Zones:

Flurox-24, Rush 24: Leave a buffer of 15 meters from water bodies, wetland areas and plants that may be injured.

Attain XC:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3
Fixed wing aircraft	6	0	100
Helicopter	6	0	80

***OcTTain XL* only:**

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Freshwater Habitat of Depths:		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field sprayer	1	0	1
Fixed wing aircraft	1	0	55
Helicopter	1	0	45

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Attain XC, Flurox-24 and Rush 24:

☠ Danger – Poison.

OcTTain XL:

☠ Caution – Poison

All products:

⚠ Warning - **Eye Irritant.**

⚠ Caution – Skin Irritant.

For an explanation of the symbols used here see page 11.

Fluroxypyr + MCPA

Herbicide Group
4 - fluroxypyr & MCPA
(Refer to page 45)

Company:

ADAMA (*Rush M*)
Nufarm Agriculture (*Trophy*)

Formulation:

The *Fluroxypyr + MCPA* package has 2 components:

***Nufarm fluroxypyr* (PCP#30194) or *MANA Fluroxypyr 180 EC* (PCP#30815):** 180 g/L fluroxypyr.

***MCPA Ester 600* (PCP#27803) or *MANA MCPA 2 EH Ester 600* (PCP#31669):** 600 g/L MCPA ester.

Container size - *Fluroxypyr* component - 4.8 L, *MCPA Ester 600* component - 7.5 L

All components above are formulated as emulsifiable concentrates.

Crops and Staging:

Spring wheat (including durum), canaryseed* & barley: - 3 leaf up to to full emergence of the flag leaf.

** Trophy only - Since the use of this product on canaryseed is registered under the User Requested Minor Use registration system, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this product on canaryseed do so at their own risk.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Weeds controlled at the 2 to 4 leaf stage, unless specified include:

Burdock
Cleavers (1 to 4 whorls)
Cocklebur
Flixweed
Hemp-nettle (2 to 6 leaf)
Kochia
Lamb's-quarters
Mustards (except dog and tansy)
Prickly lettuce
Ragweed (common)
Redroot pigweed
Shepherd's-purse
Stinkweed
Sunflower (annual)
Vetch
Volunteer canola
Volunteer flax (1 to 12 cm)
Wild mustard
Wild radish

Weeds suppressed include:

Smartweed (green)
Stork's-bill (1 to 8 leaf)
Wild buckwheat (1 to 4 leaf)

Rate:

***Fluroxypyr* component:** 0.24 L per acre

***MCPA Ester 600* component:** 0.38 L per acre.

(One case treats 20 acres)

Make only one application of products containing fluroxypyr per year.

Application Information:

Water Volume: Minimum 40 L per acre.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Trophy activity is influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought, heat or cold stress) or if extremely heavy infestations exist.

Tank Mixes:

Tank mix partners may be mixed at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:
In spring wheat (including durum) and barley:
Assert plus pH adjuster.
Tralkoxydim (Achieve Liquid or *Bison* only)
In Spring wheat (including durum) only:
Clodinafop (*Ladder* only)*

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.*
Rush M only.

Note: The above mixes are those listed on the *Trophy* label only.

Individual manufacturers may also support additional mixes that are not on the Fluroxypyr+MCPA labels. Check with manufacturers for more details.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze, harvest forage or cut hay within 7 days of application. Remove meat animals from treated fields at least 3 days before slaughter.

Preharvest: Leave 60 days from application to harvest.

Re-cropping: Wheat, barley, oat, rye, forage grasses, flax, canola, mustard, lentil and pea may be grown the year after application. There are no re-cropping restrictions the second year after application.

Aerial Application: DO NOT apply by air.

Storage: May be frozen. If frozen, bring to room temperatures and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack applications do not require a buffer.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

☠ Danger – Poison.

◇ Warning – Eye Irritant.

▽ Caution – Skin Irritant.

For an explanation of the symbols used here see page 11.

Focus

Herbicide Group
14 – carfentrazone
15 – pyroxasulfone
(Refer to page 45)

Company:

FMC of Canada

Formulation:

The *Focus* package contains:
Aim EC Herbicide **(PCP#28573):** 240 g/L carfentrazone formulated as an emulsifiable concentrate.
Container size - 1 x 2 L
Pyroxasulfone 85 WG **(PCP#30572):** 85% pyroxasulfone formulated as a water dispersible granule.
Container size - 2 x 2 kg

Crops, Rates and Staging:

Apply prior to seeding of or up to 3 days after seeding Wheat (spring and winter, NOT durum)*, Corn, Soybean:

COMPONENT	RATE BY SOIL TYPE	
	Coarse to Medium	Medium Fine to Fine
Aim	30mL per acre	36mL per acre
Pyroxysulfone 85 WG	60g per acre	73g per acre
Per case	66 acres	55 acres

***** DO NOT apply prior to seeding durum wheat.***

Coarse to Medium soils	Medium-Fine to Fine soils
Sand, Loamy sand, Sandy loam, Loam, Silt loam, Silt	Sandy clay loam, Sandy clay, Silty clay loam, Silty clay, Clay loam, Clay

Note: Focus or other products containing carfentrazone or pyroxysulfone may only be applied once per season.

Use *Agral 90* or *Ag-Surf* at 0.25 L per 100 L of spray solution or *Merge* at 1 L per 100 L of spray solution for emerged broadleaf weeds.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

WARNING – application to emerged crops will result in severe damage to the crop. *DO NOT use on peat or muck soils and soils with 7% or more organic matter content.*

Weeds and Staging:

Control of the following weeds emerging from seed (not controlled if emerged at application):

Barnyard grass
Brome (downy, Japanese)
Cleavers
Foxtail (green, yellow)
Lamb's-quarters*
Redroot pigweed
Ryegrass (Italian)
Stinkweed
Waterhemp (Common)
Wild oats*

*Suppression only.

Control of the following weeds up to 10 cm tall (post-emergent):

Cocklebur
Kochia
Lamb's-quarters
Nightshade (eastern black, hairy)
Pigweed (prostrate, red-root, smooth, tumble)
Purslane
Round-leaved mallow
Stinkweed
Tansy mustard
Volunteer canola (all varieties)

Application Information:

Water Volume: Minimum of 40 L per acre. Higher spray volume is required for dense weed stands. Weed control improves with the amount of coverage.

Nozzles & Pressure: Maximum 35 psi (210 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Moisture is necessary to activate the *Pyroxasulfone* component in soil for effective weed control. Dry weather following applications may reduce effectiveness.

Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Tank Mixes:

Herbicides:

Prior to Corn only:

AAtrex (0.85 to 1.25 L per acre) (soil activity).

Prior to All Crops:

*Glyphosate** (180 to 360 grams ae per acre)

*IPA or K salt only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall 6 to 8 hours after application may reduce activity of the *Aim* component. Heavy rainfall shortly after application may reduce weed control. Moderate rainfall beyond the above limitations will improve the activity of the *Pyroxasulfone* component.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Grazing: DO NOT graze treated corn or soybean or cut for feed. Spring or winter wheat may be grazed or cut for feed or hay 42 days after seeding.

Preharvest Interval: Not applicable.

Re-cropping: Conduct a field bioassay to confirm crop safety prior to seeding any rotational crops other than field corn or soybeans.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place in original container.

Buffer Zones:

Application Method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	5	3	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

⚠ Warning – Contains the allergen, sulfites.

Potential skin sensitizer

For an explanation of the symbols used here see page 11.

Fortress

Herbicide Group

3 - trifluralin

8 - triallate

(Refer to page 45)

Company:

Gowan Canada (PCP#19521)

Formulation:

10% triallate and 4% trifluralin formulated as a granular.

Container size – 22.7 kg, 454 kg

Crops and Staging:

Prior to planting wheat (spring and durum), barley, canola, flax (not including Solin – low linolenic acid flax), mustard.

Preplant incorporated: In fall after September 15 until soil freeze-up or in the spring prior to seeding crop.

Surface application: Apply in the fall after October 1 and when soil temperature is less than 4°C at a depth of 2 inches (5 cm) and delay incorporation until the following spring.

DO NOT apply to fields with heavy crop residues or after snow has fallen. Some wheat or barley injury may be noted on eroded knolls.

Weeds and Staging:

Pre-emergent control of wild oats, green foxtail, yellow foxtail.

Suppression of lamb's-quarters, kochia, redroot pigweed, Russian thistle, wild buckwheat.

Rates:

Fortress – Fall Treatment

	RATE (KG/ACRE)				ACRES TREATED PER 454 KG BAG			
	Organic Matter				Organic Matter			
CROP	Less than 2%	2 to 4%	4 to 6%	Greater than 6%	Less than 2%	2 to 4%	4 to 6%	Greater than 6%
Wheat	N.R.*	4.4	5.7	5.7**	N.R.*	102	80	80
Barley	4.4	5.7	5.7	6.9	102	80	80	66
Canola, flax†, mustard	5.7	5.7	5.7	6.9	80	80	80	66

* N.R. -Not Recommended.

** For fall incorporated applications (not surface) apply 6.88 kg/acre when organic matter exceeds 8 percent.

† Excluding Solin (low linolenic acid flax).

Fortress – Spring Treatment

	RATE (KG/ACRE)				ACRES TREATED PER 454 KG BAG			
	Organic Matter				Organic Matter			
CROP	Less than 2%	2 to 4%	4 to 6%	Greater than 6%	Less than 2%	2 to 4%	4 to 6%	Greater than 6%
Wheat	N.R.*	N.R.*	4.4	5.6	N.R.*	N.R*.	102	80
Barley	N.R.*	4.4	5.7	6.9	N.R.*	102	80	66
Canola, flax†, mustard	5.7	5.7	6.9	6.9	80	80	66	66

* N.R. -Not Recommended.

† Excluding Solin (low linolenic acid flax).

Application Information:

Fortress may be applied in the fall with or without a fall tillage operation, or in the spring as a preplant incorporated treatment. Before application of this product, the soil must be in good working condition. Application to a field that is wet, lumpy, rough or ridged will result in reduced weed control and promote crop thinning.

Fall Surface Application: Where fields are prone to water and/or wind erosion, and tillage is therefore undesirable, fall surface application should be made within 3 weeks of soil freeze-up, when the soil begins to cool (less than 4°C), which typically begins on or around October 1. Application can be made to standing stubble or to previously worked fields with incorporation delayed until spring. For best results on heavy wild oat infestations, use the incorporated treatment.

Fall Incorporated Application: *Fortress* must be applied after September 15 and before soil freeze-up. Application prior to September 15 may result in reduced weed control. Initial incorporation may be completed within 24 hours of application. The second incorporation may be done in the fall (prior to soil freeze-up) or in the spring prior to, or after, seeding. If performed after seeding, it must be completed with harrows prior to emergence of the crop. Fall incorporation is not recommended on soils where a lack of crop residue cover combined with the required incorporation operation could result in soil erosion.

Spring Application: *Fortress* can be applied before seeding but must be incorporated within 24 hours of application. The second incorporation must be delayed at least 48 hours after the first and may be performed at any time prior to crop emergence.

Incorporation:

Fortress applications require two incorporations, with the second incorporation at right angles to the first. Seeding with a seeder that provides soil disturbance equivalent to a cultivator may replace one incorporation. Incorporate to a maximum depth of 2 inches (5 cm) by setting disk or cultivator implements to cut a maximum of 3 inches (7.5 cm) into the soil. Mixing the product to greater depths will dilute the herbicide, decrease wild oat control, and may cause injury to cereals. If the second incorporation is conducted after seeding, it should be done with harrows or other suitable tillage equipment adjusted so as not to disturb the seed. Harrowing does not provide effective incorporation if compact soil prevents penetration of harrow teeth, if crop residue accumulates in the harrow sections, or if the harrows bounce.

Seeding Requirements: Accurate seeding depth control is critical. Thinning of wheat and barley has been known to occur when seeding depth has been inadequate. Ensure that cereals are seeded below the treated layer (2 to 3 inches or 5 to 7.5 cm). Do not seed deeper than 3 inches (7.5 cm). To ensure an even crop stand, increase the usual seeding rate of wheat or barley by 10 percent, especially if soil conditions are cold or dry. See product label for more information.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop injury can occur on fields where *Fortress* has been applied and heavy rainfall or cold weather occur after seeding but prior to crop emergence. Seeding under warm soil conditions (greater than 10ºC and generally after May 15) will ensure optimum crop germination and emergence and will reduce the risk of crop injury. Very dry conditions in spring or prolonged cool soil temperatures at time of wild oat germination will result in reduced control. Poor results may be expected from incomplete incorporation due to wet, cloddy soil or heavy crop residues. Ridges left at seeding may disrupt the treated layer and allow weed escapes.

Restrictions:

Rainfall: Moisture is required for activation. Rainfall of at least 0.6 inches (1.5 cm) within 2 weeks of seeding is required to ensure optimum results.

Re-entry: DO NOT enter treated fields for at least 12 hour

Grazing: DO NOT graze or cut treated crops for livestock feed prior to crop maturity.

Re-cropping: *Fortress* will leave a residue in the soil. Oats, canaryseed, and small seeded forage grasses may be injured if planted within 24 months of application. DO NOT apply *Fortress* on land to be sown to wheat if the land has been treated with trifluralin since June 1 of the previous year.

Aerial Application: May be applied by airplane with attachments designed for applying low volumes of granules.

Storage: Store in a cool, dry place.

Hazard Rating:

⚠ Warning – contains the allergen soy.

May cause Skin and Eye Irritation

For an explanation of the symbols used here see page 11.

Frontier Max

Herbicide Group
15 - dimethanamid
(Refer to page 45)

Company:

BASF Canada (PCP#29194)

Formulation:

720 g/L dimethanamid-P formulated as an emulsifiable concentrate.

Container size - 3 L to 1000 L.

Crops and Staging:

Pre-plant incorporated:
Corn (**NOT** sweet corn, popcorn, or corn grown for seed).
Dry beans (white and kidney beans only).

Pre-emergence surface:
Dry beans (white and kidney beans only).

Weeds and Staging:

Pre-emergent control of green foxtail.

Rates:

Pre-plant incorporated treatments:
Apply at 0.35 to 0.39 L per acre. Apply at the higher rate on fine-textured or high organic soils and for heavier anticipated weed problems.

Pre-emergence surface treatments:

SOIL TYPE (Texture)	RATE (L PER ACRE)		
	Less than 3% Organic Matter	3 to 6% Organic Matter	7 to 10% Organic Matter
Coarse	0.31	0.31	0.35
Medium and Fine	0.31	0.35	0.39

Application Information:

Water Volume: A minimum of 40 L per acre.

Pressure: 30 to 43 psi (200 to 300 kPa).

Nozzles: Flat fan or flood-jet. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use 16 mesh suction screen, 50 mesh elsewhere on sprayer.

Incorporation: For pre-plant incorporated treatments, apply *Frontier Max* as a broadcast treatment and incorporate using a harrow, rolling cultivator or other implement capable of giving uniform, shallow incorporation into the top 5 cm (2 inches) of soil within 7 days of planting. Avoid deeper incorporation or reduced weed control and/or crop injury may result. Immediate incorporation after application is not necessary.

Beans must be planted at least 4 cm (1.5 inches) deep or crop injury may occur.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Rainfall is required within 7 to 10 days of application to activate and move *Frontier Max* into the soil zone. If dry conditions persist, a shallow cultivation or the use of a rotary hoe is necessary to move the herbicide into moist soil and control weed escapes. Shallow tillage is important to minimize dilution of the herbicide. If drought conditions persist after pre-plant incorporated or pre-emergence applications, weed control may not be adequate.

Tank Mixes:

Herbicides: None registered.

Fertilizers: May be applied with a liquid fertilizer carrier. Test compatibility with liquid fertilizer by mixing a small amount of herbicide with a proportional quantity of liquid fertilizer in a jar. May also be impregnated on dry bulk fertilizers for pre-plant incorporated treatments. A minimum of 90 kg/acre of dry bulk fertilizer should be applied. DO NOT impregnate *Frontier Max* on nitrate fertilizers, superphosphates or limestone.

Insecticides: None registered.

Note: The above mixes are those listed on the *Frontier Max* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall after application is important for good weed control.

Re-entry: DO NOT enter treated fields for 24 hours.

Grazing: DO NOT graze or feed the treated corn crop within 40 days of application. DO NOT graze the treated bean crop or feed bean forage, hay or straw to livestock.

Re-cropping: DO NOT plant winter wheat within 120 days of application.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Must be stored under heated warehouse conditions.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	3

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70%** when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 15 to 16. When mixing with other pesticides, combine the method above with the method recommended for the tank mix partner if different from above for thorough cleaning.

Hazard Rating:

☠ Caution – Poison.

◈ Warning – **Eye Irritant and Potential Skin Sensitizer.**

For an explanation of the symbols used here see page 11.

Frontline 2,4-D (this referring text to be removed in the 2018 edition)

See florasulam + 2,4-D on page 169.

Frontline XL (this referring text to be removed in the 2017 edition)

See florasulam + MCPA Ester on page 175.

Glyphosate

Herbicide Group
9 - glyphosate
(Refer to page 45)

Product names, Company, Formulation and Package sizes:

All products are formulated as solutions.

Product Name	Company	Salt type*	Active** content (g a.e. /L)	Package sizes***
Cheminova Glyphosate (PCP#26828)	FMC of Canada	IPA	356	2, 3, 7
ClearOut 41 Plus (PCP#28322)	Farmers of North America	IPA	360	2, 7
Credit 45 (PCP#29124)	Nufarm Agriculture	IPA	450	1, 3, 7
Crush'R Plus (PCP#29995)	AgriStar	IPA	360	1, 2, 7, 11
Crush'R 540	AgriStar	K+	540	1, 2, 10, 11
Glyfos (PCP#24359)	FMC of Canada	IPA	360	1, 2, 3, 7
Glyphosate 480	AgriStar	IPA	480	1, 2, 10, 11
Lajj Plus (PCP#29677)	Ray Glenn Commodities	IPA	360	1, 2
Matrix (PCP#29775)	IPCO	DMA	480	1, 2, 3, 6
Maverick III (PCP#28977)	Dow AgroSciences	DMA	480	1, 2, 3, 6
MPower Glyphosate (PCP#29290)	Farmers of North America	IPA	360	2, 4, 7
Roundup Transorb HC (PCP#28198)	Monsanto	K+	540	1, 2, 3, 7, 10
Roundup Ultra 2 (PCP#28486)	Monsanto	K+	540	1, 2, 3, 8
Roundup WeatherMax (PCP#27487)	Monsanto	K+	540	1, 2, 3, 7, 10
R/T 540 (PCP#28487)	Monsanto	K+	540	1, 2, 5, 10
Smoke (PCP#31063)	Great Northern Growers	IPA	360	2, 7
Sharpshooter (PCP#28631)	**Loveland Products Canada**	IPA	356	2, 5, 7
Sharpshooter Plus (PCP#28623)	**Loveland Products Canada**	IPA	360	1, 2, 3, 4
StartUp (PCP#29498)	**Loveland Products Canada**	K+	540	1, 2, 3, 4
Touchdown Total (PCP#28072)†	Syngenta Canada	K+	500	1, 2, 3, 7
Traxion (PCP#29201)†	Syngenta Canada	K+	500	1, 2, 3
Vantage Plus Max II (PCP#28840)	Dow AgroSciences	DMA	480	2, 6, 7
Vector (PCP#30319)	Federated Co-operatives	DMA	480	1, 2, 3, 6
Vector 540 (PCP#31327)	Federated Co-operatives	K+	540	1, 2, 3, 6
Wise-Up (PCP#29126)	Adjuvants Plus	IPA	356	2, 5

* **Salt type: IPA = Isopropylamine, MA = Monoammonium, DA = Diammonium, DMA = dimethylamine, K+ = Potassium**

** **Formulation concentration is expressed as "grams of acid equivalent per litre of product (g a.e./L).**
Glyphosate acid is the herbicidally active component of the formulation and is proportional to the activity of the formulation
Note: Some products may be more effective due to formulation differences (not related to higher glyphosate content) under adverse conditions, but that benefit is reduced when applications are made under optimal conditions for activity (i.e. rapid weed growth, clean leaf surfaces). When selecting a glyphosate product, consult the product

*** **Container sizes available:** 1) 2 x 10 L or 1 x 20L, 2) 115 L, 3) 450 L, 4) 667 L, 5) 750 L, 6) 960 L, 7) 1000 L, 8) 1150 L, 9) 1200 L, 10) 800 L, 11) 510 L.

† *Note: This product is no longer manufactured but inventories still remain in distribution. This product may be removed from future editions.*

Product volumes (per acre) for various formulations strengths based on grams acid equivalent (g ae) rate

RATE (G ae per ACRE)	Glyphosate formulation concentration (g ae/L)				
	356/360	450	480	500	540
36.5	100 mL	81 mL	76 mL	73 mL	67 mL
73	200 mL	162 mL	152 mL	146 mL	134 mL
110	0.3 L	0.24 L	0.23 L	0.2 L	0.2 L
120	0.33 L	0.27 L	0.25 L	0.24 L	0.22 L
136	0.38 L	0.30 L	0.28 L	0.27 L	0.25 L
145	0.4 L	0.32 L	0.3 L	0.28 L	0.27 L
180	0.5 L	0.4 L	0.38 L	0.36 L	0.33 L
275	0.77 L	0.61 L	0.57 L	0.54 L	0.51 L
325	0.91 L	0.73 L	0.68 L	0.65 L	0.61 L
360	1.0 L	0.81 L	0.76 L	0.73 L	0.67 L
510	1.42 L	1.13 L	1.1 L	1.0 L	0.94 L
540	1.5 L	1.21 L	1.13 L	1.09 L	1.0 L
650	-		-	1.30 L	
690	1.9 L	1.54 L	1.44 L	1.38 L	1.28 L
720	2.0 L	1.62 L	1.5 L	1.46 L	1.34 L
1020	2.8 L	2.27 L	2.13 L	2.02 L	1.89 L
1750	4.9 L	3.88 L	3.6 L	3.48 L	3.24 L

Crops and Uses:

1. Annual weed control prior to crop emergence or in fallow.
2. Quackgrass control prior to seeding or after harvest.
3. Dandelion control (other than Preharvest).
4. Canada thistle control in fallow, shelterbelts and post harvest.
5. Alfalfa control (other than Preharvest).
6. Other perennial weeds control in fallow, shelterbelts and post-harvest.
7. Patch treatments of perennial weeds in cereals, corn, soybean and forages.
8. Preharvest perennial weed control.
9. For use in Glyphosate tolerant crops.
10. Tank Mixes.

1. Annual weed control prior to crop emergence or in fallow:

Weeds listed may not occur on all product labels. Check individual product labels for a specific list of weeds controlled.

RATE (g ae per acre)	SURFACTANT*	WEEDS CONTROLLED	WEED STAGE
110	0.14 L/acre	**Grasses:** Green foxtail, volunteer cereals, wild oat (light infestations) **Broadleaves:** lady's-thumb, stinkweed, volunteer canola (NOT including glyphosate tolerant varieties), wild mustard.	Less than 3 inches (8 cm) high. Apply at the 1 to 3 leaf stage of wild oat.
145	0.14 L/acre	*Above weeds plus:* **Grasses:** heavy infestations of wild oat. **Broadleaves:** suppression of flixweed, kochia.	1 to 3 leaves for wild oat Weeds 3 to 6 inches (8 to 15 cm).
180 to 275	Not required	*Above weeds plus:* **Grasses:** downy brome, Persian darnel. **Broadleaves:** Canada fleabane, cleavers, common ragweed, flixweed, hemp-nettle, lamb's-quarters, narrow-leaved hawk's-beard, redroot pigweed, Russian thistle, volunteer flax, wild buckwheat.	Canada fleabane, common ragweed, less than 3 inches (8 cm) high. Other weeds less than 6 inches (15 cm). Use high rate for narrow-leaved hawk's-beard 3 to 6 inches (8-15 cm) or wild buckwheat at the 3-4 leaf stage.
325	Not required	*Above weeds plus:* **Grasses:** annual blue grass, crabgrass. **Broadleaves:** annual sow-thistle, kochia, prickly lettuce, shepherd's-purse, narrow-leaved vetch**.	Less than 6 inches (15 cm) high
510	Not required	*Above weeds.*	Greater than 6 inches (15 cm) high

* Unless otherwise specified on the product label, use one of the following surfactants: *Agral 90, Agsurf II, Companion* or *LI700.*

** Note: Narrow-leaved vetch is an annual species. Establish perennial vetches such as American vetch, may not be controlled at this rate.

2. Quackgrass control prior to seeding or after harvest:

RATE (g ae per acre)	QUACK GRASS STAGE
360	Season long control of light to moderate infestations. Apply when quack grass is 8 inches (20 cm) tall and has 3 to 4 actively growing leaves. Apply spring or fall.
360 to 1020	Apply when quack grass has 3 to 4 new leaves for long term control of heavy infestations. Use high rate for sod-bound quack grass (left undisturbed for at least 2 years).

DO NOT apply fall treatments if a hard frost has occurred (-5°C) or if plants are drought stressed. Spread straw to allow regrowth and good spray coverage.

Cultivation prior to application will result in reduced control. DO NOT cultivate between harvest and treatment when using fall applications. If using spring applications on fields which have been fall-tilled, delay application until the quack grass has reached the 4 to 5 leaf stage. (This will occur 1 to 4 weeks later on fall-tilled fields than in undisturbed fields).

Cultivation after application usually will improve control of quack grass. Wait a minimum of 3 days after application before cultivating. If growing conditions are poor (cold or dry), particularly in the fall, waiting longer than 5 days may improve control.

3. Dandelion control (other than Preharvest):

Apply up to and including dandelion bloom for best results.

RATE (g ae per acre)	DANDELION GROWTH STAGE
360	Less than 6 inches (15 cm) diameter. Allow 3 or more days after treatment before tillage.
540 to 720	Greater than 6 inches (15 cm) diameter. Use higher rate when infestations are heavy.

4. Canada thistle control in fallow, shelterbelts and post-harvest:

RATE (g ae per acre)	WEED STAGING
360	Rosettes at least 6 inches (15 cm) in diameter, treated in late summer, following tillage in spring and early summer (up to August 1). Allow thistles to regrow for 5 weeks following last tillage. Wait a minimum of 10 days after application before tillage. Treatment after a mild frost is possible if leaves are green and pliable and plants are actively growing.
690 to 1020	Bud stage or beyond. Allow at least 5 days after application before tillage. -or- Post harvest treatment. Allow 8 to 10 inches (20 to 25cm) of new growth before application. Must be sprayed at least2 weeks prior to killing frost. Straw should be removed or evenly spread to allow for proper regrowth and spray coverage.

5. Alfalfa Control (other than Preharvest):

RATE (g ae per acre)	WEED STAGING
540 to 720	Fall control of alfalfa in early bud to full bloom stage. Use high rate when alfalfa populations are high or when perennial grasses are present. Allow at least 5 days before tillage. See tank mix section for minimum tillage or spring applications. Apply with 23to 135 L per acre water.
***Touchdown Total* and *Traxion* only:** 325 to 650	Prior to seeding or after harvest. Use higher rate for weeds beyond 3 inches (8 cm) in height or for heavy weed infestations. Wait 7 days after application for tillage. Apply in 23 to 135 L per acre water.

6. Other perennial weed control in fallow, shelterbelts and post-harvest:

(Refer to individual product labels for detailed application information.)

Foxtail Barley: Suppression with *Touchdown* and *Traxion* only at 0.28 L per acre.

Control from seedling to heading (all products) at 360 to 720 g ae per acre. Late fall applications may provide better control of established foxtail barley plants than spring applications.

Yellow toadflax: 360 g ae per acre.

Other Perennial weeds*: 1020 to 1750 g ae per acre

* Perennial weeds such as absinthe, blue grass spp., smooth brome grass, cattail, curled dock, field bindweed (bloom stage or beyond), hemp dogbane, hoary cress, poison ivy, purple loosestrife, perennial sow-thistle, and yellow nutsedge applied at the early heading to early bud stage.

7. Patch treatments of perennial weeds in wheat, oat, barley, corn, soybean, forage legumes and forage grasses:

(Refer to individual product labels for detailed application instructions)

RATE (g ae per acre)	WEED
360 to 1020	Quack grass 8 in (20 cm) tall
690 to 1020	Canada thistle Bud or beyond
1750	Milkweed Bud to bloom
1020 to 1750	Other perennial weeds*
36.5 to 73	Spot treatment rates for hand held equipment (per 10 L water**)

* Perennial weeds such as absinthe, blue grass spp., smooth brome grass, cattail, curled dock, field bindweed (bloom stage or beyond), hemp dogbane, hoary cress, poison ivy, purple loosestrife, perennial sow-thistle, and yellow nutsedge applied at the early heading to early bud stage.

** Use the low rate for quack grass and the high rate for all other perennials.

8. Preharvest perennial weed control:

DO NOT apply to any crops grown for seed.

Not all glyphosate products are registered for Preharvest applications on all crop species listed below. Refer to specific glyphosate labels for a list of registered uses and crop species.

RATES:

Prior to the harvest of annual grains (see staging chart below for specific crops): 360 g ae per acre.

Prior to the final cut of forages to be removed from production: 360 to 720 g ae per acre.

Weeds Controlled with Preharvest applications:

Quack grass 4-5 green leaves	Canada thistle and perennial sow-thistle at bud stage or beyond	Common milkweed at bud to bloom stage	Toadflax at bud to full bloom stage	Dandelion from rosette to full bloom stage
X	X	X	X	X

Crop Staging for Preharvest applications:

Apply to crops (except forage) when grain moisture is less than 30%. The following chart lists visual symptoms that can be used as guidelines to when 30% grain moisture has been reached.

CROP*	VISUAL SYMPTOMS
Wheat, Barley*, Oat*	Hard dough stage – a thumbnail impression remains on seed.
Canola, Mustard***†	Pods are green to yellow and most seeds are yellow to brown.
Flax (and Solin - low linolenic acid flax)	Majority (75 to 80% of bolls) are brown.
Lentil	Lowermost pods (bottom 15%) are brown and rattle when shaken.
Pea	Majority (75 to 80%) of pods are brown.
Chickpea**†	Stems are green to brown in colour: pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves).
Lupin**	Stems are green to brown in colour: pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves).
Faba bean**†	Stems are green to brown in colour: pods are mature (yellow to brown in colour); 80%-90% leaf drop (original leaves).
Soybean	Stems are green to brown in colour and pod tissue is brown and dry in appearance (80 to 90% leaf drop).
Dry Bean	Stems are green to brown in colour and pods are mature (yellow to brown) and 80 to 90% of the original leaves have dropped.
Forage	3 to 7 days prior to the last cut before rotation or forage renovation. DO NOT apply to forage stands that are to be maintained.

* Registered for application to barley grown for malt and tame oat grown for milling. Contact malt barley or milling oat buyers prior to application to confirm acceptance of glyphosate-treated grain.

** Preharvest applications on these crops are registered with *Roundup Transorb HC, Roundup WeatherMax, R/T 540, StartUp* and *Roundup Ultra 2* only.

*** (yellow / white, brown, oriental), *RoundUp Weather Max* only.

† *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance. Those who apply glyphosate to chickpea, lupin, fababean, or mustard do so at their own risk.*

9. For use in glyphosate tolerant canola:

Weeds, Staging and Rates:

All applications must be made within the cotyledon to 6 leaf stage of glyphosate tolerant canola. Temporary yellowing may occur if applied at the 4 to 6 leaf stage of the crop.

Not all glyphosate products are registered for use on glyphosate tolerant canola at all rates listed. Refer to individual product labels for specific uses and rates.

Single applications of 120 g ae per acre:
Weeds controlled at all stages unless indicated otherwise:
Annual grasses: barnyard grass, green foxtail, volunteer cereals, wild oat.
Annual broadleaves: annual smartweed spp.**, chickweed, corn spurry, cow cockle*, hemp-nettle, kochia, lamb's-quarters, night-flowering catchfly*, redroot pigweed, Russian thistle, shepherd's-purse*, stinkweed, volunteer canola (except glyphosate tolerant varieties), wild mustard, wild tomato.

Single applications of 180 g ae per acre:
All stages of the weeds listed above plus:
Annual broadleaves: cleavers, flixweed, wild buckwheat, stork's bill, narrow-leaved hawk's-beard.
Perennial weeds suppressed: Canada thistle, dandelion, perennial sow-thistle, and season long quack grass control.

Double application of 180 g ae per acre plus 180 g ae per acre:
Additional flushes of the weeds Listed above plus:
Annual broadleaves: round-leaved mallow
Season long control of following perennials: Canada thistle, foxtail barley, and perennial sow-thistle.

Single application of 270 g ae per acre:
All weeds in single applications above plus:
Season long control of following perennials: Canada thistle and perennial sow-thistle.

* Low rates can be used only up to the 3 leaf stage of the crop otherwise use the high rate.

** Low rates can be used only when annual smartweed is in the 4 to 6 leaf stage.

NOTE: **A maximum of 360 g ae per acre per season is allowed in glyphosate tolerant Canola**

10. For use in glyphosate tolerant corn and soybean: Weeds, Staging and Rates:

All applications must be made within the following crop growth stages.
Corn - up to and including 8 leaf stage
Soybean - first trifoliate leaf through flowering.

Not all glyphosate products are registered for use on glyphosate tolerant corn and soybeans at all rates listed. Refer to individual product labels for specific uses and rates.

Single application of 360 g ae per acre controls the following weeds:

Grasses:

Barnyard grass
Crabgrass spp.
Foxtail (green, yellow, giant)
Proso millet
Quack grass
Volunteer barley and wheat
Wild oats

Broadleaves:

Biennial wormwood*
Canada thistle
Chickweed
Cleavers
Corn spurry
Cocklebur
Cow cockle
Common milkweed (suppression only)
Common ragweed
Flixweed
Hemp-nettle
Kochia
Lamb's-quarters
Narrow-leaved hawk's-beard
Night-flowering catchfly
Night-shade, eastern black
Perennial sow-thistle
Pigweed (smooth, redroot)
Round-leaved mallow
Russian thistle
Shepherd's-purse
Smartweed spp.
Stinkweed (suppression only)
Stork's-bill
Velvetleaf
Volunteer canola (except glyphosate tolerant varieties)
Wild mustard
Wild buckwheat
Wild tomato

* Registered for control in glyphosate tolerant soybean only with *Roundup* products and R/T 540 only.

Second applications of 360 g ae per acre controls the following weeds:

Late flushes of heavy infestations of the above weeds plus control of:

Common milkweed
Field bindweed
Round-leaved mallow
Yellow nutsedge

Single application of 720 g ae per acre in glyphosate tolerant soybean from the first trifoliate to flowering stage and corn up to and including 6 leaf stage:
Heavy infestations of the annual weeds listed above plus control of:

Field bindweed
Common milkweed
Canada thistle
Perennial sow-thistle
Yellow nutsedge

** The single application rate in glyphosate tolerant corn and soybean is not labeled for all glyphosate products. Refer to individual glyphosate labels for the registration status of this rate usage in glyphosate tolerant soybean and corn.

11. Tank Mixes:

Not all glyphosate products are registered for all tank mix options below. Refer to individual glyphosate labels for registered tank mixes, glyphosate rates and registered crop species.

	RATE PER ACRE
Preseeding canola[††]	*Bromoxynil-Pardner* (0.51 L), *Koril* (0.48), *Brotex* (0.6 L)
Preseeding cereals[***]:	*2,4-D*[◇] (108 to 273 g ae)[*]
	Banvel II (0.12 L)[*]
	Bromoxynil - *Pardner* (0.51 L), *Koril* (0.48), *Brotex* (0.6 L)
	MCPA[◇] (0.2 to 0.4 L)[*]
	Bromoxynil/ MCPA[*] - *Buctril* M (0.2 to 0.4 L), *Logic M* (0.25 to 0.5 L)
Preseeding corn (field and sweet) & flax:	*MCPA*[◇◇] (0.2 to 0.4 L)[*]
	Bromoxynil/ MCPA[*] - *Buctril M* (0.2 to 0.4 L), *Logic M* (0.25 to 0.5 L)
Preseeding corn (field only)	*Banvel II* (0.12 L)[*]
Preseeding field pea, lentil[†] & chickpea[†]:	*MCPA* Amine[◇◇] (0.2 to 0.28 L)[*◇]
Preseeding canaryseed & seedling forage grasses[◇◇◇]:	*Bromoxynil/ MCPA*[*] - *Buctril M* (0.2 to 0.4 L), *Logic M* (0.25 to 0.5 L)
Chem fallow:	*2,4-D*[◇] (235 g ae)[*]
	Dicamba (0.12 L)[*]
	Bromoxynil - *Pardner* (0.51 L), *Koril* (0.48), *Brotex*(0.6)
Canada thistle control following harvest or in fallow:	*Dicamba* (0.51 L)[**]
Alfalfa control in spring / fall:	*2,4-D* (235 to 470 g ae)[*]

[*] Volunteer glyphosate tolerant canola control: Tank mixes of *2,4-D* at 108 to 160 g ae per acre, *MCPA* and *Bromoxynil/ MCPA* will control volunteer glyphosate tolerant canola up to the 4 leaf stage and *2,4-D* at 212 to 320 g ae per acre will give control up to the 6 leaf stage. Earlier application will result in more consistent control. *Dicamba* at 0.12 L per acre will not control glyphosate tolerant canola.

[**] See re-cropping restrictions for *Dicamba* with fall applications.

[***] 2,4-D tank-mixes in cereals are registered for winter wheat, wheat, barley, and rye; Bromoxynil tank-mixes in cereals are registered on wheat, oats and barley; bromoxynil/MCPA and MCPA tank-mixes registered on cereals include wheat, barley oat and rye; *Banvel II* tank-mixes in wheat, barley, rye oats.

[†] Under drought conditions, deep seeding and/or brief rain showers after seeding may cause injury to emerging seedlings in sprayer overlaps. NOT for use with *Cheminova Glyphosate, Credit 45, Glyphos, Lajj Plus, MPower Glyphosate, SharpShooter, SharpShooter Plus, Smoke,* or *Wise Up.*

[††] *Roundup WeatherMax* and *Credit 45* only.

[◇] Rates based on 500 g/L formulations. All formulation concentrations are registered unless indicated otherwise.

[◇◇] Use only amine formulations of *MCPA* prior to corn, lentil, chickpea and field peas.

[◇◇◇] Forage grasses include brome grass, crested wheatgrass, intermediate wheat grass, slender wheatgrass, tall wheatgrass, Russian wildrye, timothy, orchard grass, creeping red fescue, meadow fescue, meadow foxtail, tall fescue, meadow bromegrass, streambank wheatgrass and reed canarygrass.

Tank mixes in glyphosate tolerant crops:

Tank mixes or rates listed may not occur on all product labels. Refer to individual product labels for registered tank-mixes.

Canola:
Lontrel 360 (112 mL / acre)
Soybean:
Assure II (101 to 154 mL / acre)
Pursuit (65 to 85 mL / acre)
Corn:
Aatrex (0.63 to 0.84 L / acre)
2,4-D single application (108 to 212 g ae / acre)*
2,4-D split application (108 g ae / acre followed by 80 to 108 g ae / acre)*
DyVel DSp (0.44 L / acre).

* 2,4-D applications to corn may result in serious injury to some corn hybrids. Consult corn seed provider for varietal tolerance to 2,4-D applications. Apply prior to 4 leaf stage of corn.

Note: The above mixes are those listed on the glyphosate labels only.

Monsanto also supports the following mixes that are not on the *Roundup* brand labels to manage glyphosate resistant kochia and other labelled weeds at the pressed burnoff timing prior to planting soybean. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Heat* (also glyphosate tolerant canola volunteers), *Valtera, Authority, Authority Charge.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. See the general guidelines for mixing pesticides for more information.

Application Information:

Water Volume:

Ground: Use 20 to 40 L per acre in most situations; use of the lower volume may improve control when hard water (Ca or Mg) or iron (Fe) ions are present (See Effects of Growing Conditions below). For certain crop situations, perennial weeds and tank mixes may require up to 120 L per acre of clean low ion water.

Aerial: Use 8.1 to 20 L per acre for registered preharvest uses only (see Aerial Application below). Minimum 20 L per acre for preseed, fallow, glyphosate tolerant crops and post-harvest treatments with *Roundup WeatherMax* only.

Refer to specific weed control situations or labels for more information on water volumes and adjuvants.

Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets for ground applications and ***ASABE coarse*** droplets for aerial applications.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Best results are achieved under relatively warm sunny conditions when weeds are actively growing. Frost which kills more than 40% of the above-ground tissue will reduce control. Control will also be reduced if foliage is heavily covered with dust. "Hard water" or water containing Calcium (Ca), magnesium (Mg) or iron (Fe) ions will reduce the activity of glyphosate products proportional to the level hardness. Reducing application water volume and /or adding ammonium sulphate at 1.2 kg/acre (99% dry) or 2.4 L/acre (49% solution) will reduce the negative effects of low levels of hard water ions. If water is extremely hard (greater than 700 ppm or 40 grains), another water source should be found. Dirty water or water with suspended soil or organic matter will reduce control.

Restrictions:

Rainfall: DO NOT apply if rainfall is forecast for the time of application, as weed control may be reduced. Consult manufacturer for more information.

Grazing Interval: All portions of forage and crops treated with glyphosate products may be fed to livestock.

Re-cropping Interval: No restrictions.

Aerial application: DO NOT apply *Cheminova Glyphosate, Credit 45, Crush'R Plus, Lajj Plus, Maverick III, Matrix, Sharpshooter, Vector* or *WiseUp* brands of glyphosate to cropland by air.

All other glyphosate products listed in the "Product names, Company, Formulation and Packaging" chart are registered for aerial application for certain pre-harvest treatments. Not all crop species listed in the pre-harvest section are registered for aerial glyphosate application. Consult manufacturer for current aerial pre-harvest registration status.

ONLY *Roundup WeatherMax* may be applied by air when fields are too wet to access by ground sprayer (flooded) for preseed burndown, fallow treatment, or application to glyphosate tolerant crops (canola, corn, soybean).
Aerial applicators of *Roundup WeatherMax* for use prior to seeding, in glyphosate tolerant crops and to fallow must have successfully completed a Roundup herbicide aerial application training course provided by Monsanto Canada.

Storage: May be stored below 0° C.

Equipment: DO NOT mix, store or apply this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks.

Buffer Zones:

Application method	Uses	Buffer Zones (metres††) Required for the Protection of:	
		Aquatic habitats	Terrestrial habitat
Ground *	All uses	15	15
Aerial	**Preharvest only****	25	55
	Preharvest only***	100	100
	Glyphosate tolerant canola only†	5	40
	Preseed, fallow, glyphosate tolerant crops (corn, soybeans)†	30	70

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using** shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** *ClearOut 41 Plus, Roundup Transorb HC, Roundup Ultra 2, Roundup WeatherMax, R/T 540, StartUp, Touchdown Total, Traxion* only.

*** *Glyfos, MPower Glyphosate, SharpShooter Plus, Vantage Plus Max II* only.

† *Roundup WeatherMax* only when conditions are too wet for access by ground sprayer.

†† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Glyphosate is very toxic to non-target plants.

Sprayer Cleaning:

Refer to page 15 to 16.

Hazard Rating:

Roundup Transorb HC, Roundup Ultra 2, Roundup WeatherMax, R/T 540:

▽ Caution - Poison

ClearOut 41 Plus, Cheminova Glyphosate, Glyphos, Roundup TransorbHC, Roundup Ultra 2, Roundup WeatherMax, R/T 540, Sharpshooter Plus:

◇ Warning – Eye and Skin Irritant

All other products:

▽ Caution – Skin and Eye Irritant. Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Glykamba*

Herbicide Group
4 - dicamba
9 - glyphosate
(Refer to page 45)

Company:

Nufarm Agriculture (PCP#30870)

Formulation:

194 g ae/L glyphosate and 46 g/L dicamba present as isopropylamine (IPA) salts formulated as a solution.
Container sizes - 10 L, 115 L, 450 L, 750 L.

** Nufarm will manufacture on a pre-order basis.*

Crops and Staging:

Fallow.

Pre-seeding on fields to be sown to wheat, barley, oats and rye.

May also be applied prior to sowing field corn in fields with more than 2.5% organic matter (DO NOT use on sandy or sandy loam soils).

Glykamba **SHOULD NOT** be applied prior to broadleaf crops such as lentils, peas, canola and flax due to the risk of injury.

Weeds, Rates and Staging:

Application should be made to emerged, actively growing weeds. Application at early growth stages generally provides the best results.

Annual grasses - Apply 1 L per acre between emergence and heading.

Downy brome
Green foxtail
Persian darnel
Volunteer cereals
Wild oats

Annual broadleaves - Apply 1 L per acre up to 6 inches (15 cm) height unless otherwise indicated.

Cow cockle
Flixweed
Kochia
Lamb's-quarters
Redroot pigweed
Russian thistle
Smartweed (including lady's thumb)
Stinkweed
Volunteer canola*
Wild buckwheat (1 to 4 leaf)
Wild mustard

* **NOT including glyphosate tolerant varieties.**

Foxtail barley suppression - Apply 1.26 L per acre before initiation of the seedhead or bottom leaves beginning to brown off.

Application Information:

Water Volume: 20 to 40 L per acre water. Avoid the use of extremely hard water (greater than 700 ppm calcium and/or magnesium or high levels of iron). Use of the lower water volume may improve control in situations where hard water is the only source available.

Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium to coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Reduced effectiveness may result if application is made to weeds that are drought stressed, damaged by disease or insects. Poor control under cool, cloudy weather can occur. Dust on foliage can also cause reduction in control.

Tank Mixes:

Herbicides:

Prior to seeding wheat, winter wheat, barley and rye only: *2,4-D Ester* or *Amine* (112 to 168 g ae/acre)* or (224 to 280 g ae/acre)**

* to control volunteer glyphosate tolerant canola up to 4 leaf stage

** to control volunteer glyphosate tolerant canola up to 6 leaf stage.

Restrictions:

Rainfall: Within 6 hours may reduce weed control. Heavy rainfall within 2 hours of application may require a repeat treatment.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT allow lactating dairy animals to graze within 7 days of treatment or cut for feed or hay within 30 days. Remove meat animals from treated areas at least 3 days prior to slaughter.

Re-cropping: No restrictions in the season following treatment. DO NOT apply in fall or spring prior to broadleaf crops such as lentils, peas, canola and flax due to the risk of injury.

Aerial Application: DO NOT apply by air.

Storage: Store above 5°C.

Equipment: DO NOT mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks.

Buffer Zones:

Product	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Medium droplets	1	1	15
Coarse droplets	1	1	5

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70%** when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Caution - Poison

Danger - Corrosive to eyes.

Warning - Skin Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Good Harvest

Herbicide Group
10 - glufosinate
(Refer to page 45)

Company:

Farmers of North America (PCP#30761)

Formulation:

150 g/L glufosinate ammonium formulated as a solution. Container sizes: 13.5 L, 108 L, 432 L.

Crops, Rates and Staging:

Harvest Aid Treatment:

CROP	RATE (L/acre)	STAGE
Alfalfa (seed production only)	0.81 to 1.09**	50 to 75% pod turn (brown)
Lentil*	1.09	40 to 60% pod turn (yellow to brown)
Potato*	1.21	14 to 21 days prior to harvest

* Not for crops grown for seed.

** use the higher rate when crop canopies or weed densities are heavy.

Application Information:

Water Volume:

Ground applications: Minimum 45 L per acre. When crop canopy and weed densities are heavy, apply in 69 to 89 L per acre of water.

Aerial applications: 13 to 22 L per acre.

Nozzles and Pressure:

Ground Application: Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles; 45 psi (310 kPA) when using check valves. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium or larger*** droplets.

Aerial applications: DO NOT use raindrop nozzles. Use a combination of nozzles and pressure to provide ***ASABE coarse*** or larger droplet size distribution.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Good Harvest activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought, and low humidity conditions slow weed growth. Applications made under these stressed conditions may result in reduced weed effectiveness.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Within 4 hours may reduce activity.

Re-Entry: DO NOT re-enter treated areas for 24 hours after application, without protective clothing as for spraying.

Grazing: DO NOT graze the treated crop or cut for feed.

Preharvest Interval: Leave 9 days between application and harvest of lentil and potato.

Re-cropping: No restrictions.

Aerial Application: May be applied by air.

Storage: DO NOT freeze.

Buffer Zones:

Ground: DO NOT apply within 15 metres of sensitive plants or water or wetland areas.

Aerial: DO NOT apply within 30 metres of sensitive plants, or water or wetland areas.

DO NOT apply when dead calm or when winds exceed 16 km/hr when using unprotected booms or applying by air, or exceeding 25 km/hr when using shrouded booms.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on page 15 to 16.

Hazard Rating:

☠ Warning – Poison

▽ Caution – Skin Irritant

◇ Warning – Eye Irritant

For an explanation of the symbols used here see page 11.

Gramoxone

Herbicide Group
22 - paraquat
(Refer to page 45)

Company:
Syngenta Canada (PCP#8661)

Formulation:
200 g/L paraquat formulated as a solution.
Container size - 4 x 5 L

Crops and Staging:
Stale seedbed: Non-selective weed control applied 3 days prior to crop emergence in beans, corn, potatoes, peas, soybeans.

Non-selective inter-row weed control: Apply as a directed spray between rows in row crops. Avoid contact with crop foliage.

Control of weed seedlings in established alfalfa and bird's-foot trefoil for hay: Apply 5 days after first cut.

Control of weed seedlings in bird's-foot trefoil for seed: Apply in spring when bird's foot trefoil shoots are 3 to 6 inches (7.5 to 15 cm) long.

Non-selective weed control – shelterbelts: Apply as a directed spray in and around shelterbelt trees or woodlot plantings. Avoid contact with foliage.

Pre or Post seeding burndown: Apply prior to crop emergence in barley, canary seed, canola, corn (field, sweet and pop), dry beans, field peas, flax, solin (low linolenic acid flax), lentils, mustard, oats, potato, rye, soybean, sunflower, triticale, wheat.

Weeds and Staging:
Annual weed burn-off. Best control when weeds are less than 2 inches (5 cm) in height or diameter.

Rates:
Pre or post seeding burndown: 0.8 to 1.6 L per acre

All other applications: If weeds are less than 2 inches (5 cm) in height, apply 1.1 L per acre (5 L treats 4.5 acres). If weeds are taller than 2 inches (5 cm), increase the rate of *Gramoxone* to 2.2 L per acre (5 L treats 2.2 acres).

Application Information:
Water Volumes:
Pre or post seeding burndown: Minimum 40 liters per acre.
All other applications: 135 to 500 L per acre. Use the higher water volumes within the range if weed growth is dense. Good coverage is critical for good control.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets.

How it Works:
Refer to Table 2 on page 47.

Effects of Growing Conditions:
Best results on cloudy days or just prior to darkness.

Tank Mixes:
Corn: *AAtrex, Dual II Magnum, Frontier Max* and *Primextra II Magnum**
Soybean: *Dual II Magnum, Frontier Max, Linuron, Sencor**
* Refer to product labels for time of application and restrictions.

Restrictions:
Rainfall: Within 1 hour will reduce weed control.

Re-entry Period: DO NOT re-enter treated fields for 24 hours following application. If necessary, workers may re-enter field after 4 hours if wearing protective clothing. See label for details.

Grazing: DO NOT graze or harvest treated foliage. Regrowth from treated alfalfa or bird's foot trefoil may be fed to livestock.

Re-cropping Interval: No restrictions

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:

Crop	Buffer Zones (metres†) Required for the Protection of:			
	Aquatic Habitats of Depths			Terrestrial habitat
	Less than 1 m	1 m to 3 m	Greater than 1 m	
Conservation tillage soybean	40	30	20	15
All other crops	50	40	30	20

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

DO NOT spray when conditions are dead clam or when wind is gusty or blowing faster than 16 km/hr.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Danger - Poison (may be fatal if swallowed)

Danger - Corrosive to eyes

For an explanation of the symbols used here see page 11.

Grazon

Herbicide Group

4 - picloram & 2,4-D

(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

Grazon **(PCP#27634):** 65 g/L picloram and 240 g/L 2,4-D formulated as a solution.

Grazon XC **(PCP#31642):** 97.5 g/L picloram and 360 g/L 2,4-D formulated as a solution.

Container size - 2 x 10 L and 110 L.

Note: Available only through selected retail outlets.

Crops and Staging:

Permanent grass pasture and rangeland. Apply in spring or early summer.

Weeds, Rates and Staging:

Broadleaf weeds:

Apply *Grazon* at 1.5 L per acre or *Grazon XC* at 1.0 L per acre for season long control ONLY:

Canada thistle
Common yarrow
Dandelion

Apply *Grazon* at 2.8 L per acre or *Grazon XC* at 1.9 L per acre: for control of the above weeds and the following weeds:

Burdock
Clovers (red, sweet)
Dock
Fleabane
Goldenrod
Plantain
Ragweed (common)
Prickly lettuce
Vetch
Wild carrot

Apply *Grazon* at 3.8 L per acre or *Grazon XC* at 2.5 L per acre for control of the following woody species:

Aspen
Balsam poplar*
Birch
Western snowberry*
Wild rose
Willow

* Suppression

Maximum one application per year.

Application Information:

Water volume*:
Ground application: 40 to 80 L per acre.
Aerial application: 8 to 20 L per acre.

* Use higher water volumes for when foliage is dense.

Nozzles and Pressure: Use nozzles that will deliver coarse droplets in a uniform pattern. Maximum 30 psi (207kPa) by ground or air when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

Drift of even small amounts of *Grazon* or *Grazon XC* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm and temperature inversions).

How it Works:

Refer to Table 2 on page 47.

IMPORTANT: Picloram is a very persistent and water-soluble herbicide. Treated soil should not be moved from the treated area. DO NOT apply to soils that are permeable, have sinkholes, or lie over limestone bedrock. DO NOT apply to soils whose surfaces are

composed of fractured rock or unconsolidated gravel. Application to these sites may allow the movement of herbicide to underlying water sources or aquifers. When applying *Grazon* or *Grazon XC* over sandy soils ensure that aquifers are not within 1.8 m of the soil surface. If shallow aquifers are present, DO NOT apply *Grazon* or *Grazon XC*. *Grazon* and *Grazon XC* must not be applied on range and pasture acres that are irrigated. DO NOT compost or mulch clippings or manure from grass treated with *Grazon* or *Grazon XC* unless being reapplied to the treated area.

Effects of Growing Conditions:

Nothing listed on the *Grazon* or *Grazon XC* label. Avoid application when pasture and target weeds are under stress from drought, flooding, extreme heat or cold, as injury to grass or unacceptable control may result. Avoid application when temperatures exceed 28°C.

Tank Mixes:

None registered.

Restrictions:

Rainfall: DO NOT apply if rainfall is forecast. No specific time frame is indicated on the label. Contact manufacturer for more information.

Re-entry: DO NOT re-enter pastures within 3 days of application.

Grazing: DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application. Feed livestock untreated forage for 7 days prior to moving onto land that produce broadleaf crops - otherwise urine or manure may contain picloram. **See restrictions in "How it Works" section above.**

Re-cropping: **Legumes may not be established in a pasture** for several years after treatment. If legumes are essential in a pasture, DO NOT use *Grazon* or *Grazon XC*. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 5 years after application.

Aerial Application: May be applied by air.

Storage: Store product in original containers in a secure, dry, cool area. DO NOT freeze.

Buffer Zones:

See page 36 for an explanation of the different habitats.

Field Sprayer (Rangeland Uses):

Product - Use Rate (L/acre)	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Grazon - 1.5	1	1	30
Grazon - 2.8	2	1	55
Grazon - 3.7 Grazon XC - 2.5	2	1	70

[*] **These distances can be reduced by 30% using cones** on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Refer to the label for buffer zone requirements for aerial application.

Heavy rains can move this product from its application site down slope toward sensitive areas. DO NOT load or mix near wells, dugouts or other water bodies.

Sprayer Cleaning:

There are no sprayer cleaning recommendations on the **product label. A combination of Method A and B found on** the general page on sprayer cleaning on page 15 to 16, or the use of a commercial tank cleaner, completed immediately after application is finished may be the best cleanout option.

Hazard Rating:

Caution - Poison

May cause skin and eye irritation

For an explanation of the symbols used here see page 11.

Harmony K

Herbicide Group
1 - clodinafop
2 - thifensulfuron & tribenuron
4 - dicamba
(Refer to page 45)

***Harmony K* is equivalent to a tank mix of *thifensulfuron/tribenuron* (page 301), *clodinafop* (page 130) plus *dicamba* (page 135). For other detailed information on the component product see the product pages listed above.**

Company:

E. I. duPont Canada

Formulation:

The *Harmony K* package contains the following components:

***Harmony Broadleaf* (PCP#30027):** 53.8% dicamba sodium salt, 7.7% thifensulfuron methyl, and 3.9% tribenuron methyl formulated as a water dispersable granule.

Container size - 2.104 kg

***Harmony Grass* (PCP#29202):** 128 g/ L clodinafop-propargyl formulated as an emulsifiable concentrate with built in adjuvant.

Container size - 1 x 7.1 L

Crops and Staging:

Spring wheat (including durum) from the 2 to 5 leaf stage.

Weeds and Staging:

Harmony K controls the same weeds as *Harmony SG* with the addition of Group 2 resistant kochia and dandelion (spring or fall rosettes less than 15 cm in diameter).

Rates:

Harmony Grass: 177 mL per acre

-plus-

Harmony Broadleaf: 52 g per acre

One package treats 40 acres (16 ha)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

See *thifensulfuron/tribenuron*, *clodinafop* and *dicamba*, pages on restrictions application details and handling. Use the most limiting restrictions across all components for the mix

Note: *Harmony K* may be applied by air.

Harmony SG*

Herbicide Group
1 - clodinafop
2 - thifensulfuron & tribenuron
(Refer to page 45)

This product is a prepackaged tank mix of *thifensulfuron/tribenuron* (page 301) and *clodinafop* (page 130). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

E. I. duPont Canada

Formulation:

The *Harmony SG** package contains the following components:

***Refine SG* (PCP#28285):** 33.35% thifensulfuron methyl + 16.65% tribenuron methyl; formulated as a water soluble granule.
Container size - 486 g bottle.

***Harmony Grass* (PCP#29202):** 128 g/ L clodinafop-propargyl formulated as an emulsifiable concentrate, with built in adjuvant.
Container size - 1 x 7.1 L

** NOTE: This product is no longer manufactured but product still remains in the distribution system. This product may be removed from future editions.*

Crops and Staging:

Spring wheat (including durum) up to the emergence of the 4th tiller.

Weeds and Staging:

Broadleaf weeds controlled or suppressed by *Refine SG* plus:

Wild oat - 1 to 6 leaves up to the emergence of the 4th tiller.

Green foxtail - 1 to 5 leaves up to the emergence of the 3rd tiller.

For optimum control apply before the annual grasses tiller.

Rates:

Refine SG: 12 g per acre

Harmony Grass: 177 mL per acre

One case treats 40 acres (16 ha)

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:

MCPA Ester (0.34 to 0.45 L/acre of 500 g/L formulation).

Banvel II (44.5 or 59 mL/acre).

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Hat Trick

Herbicide Group

4 – fluroxypyr, clopyralid, MCPA

(Refer to page 45)

Company:

Loveland Canada (PCP#31727)

Formulation:

61 g/L fluroxypyr, 61 g/L clopyralid and 224 g/L MPCA ester formulated as emulsifiable concentrate liquid.

Container size: 2 x 8.5 L, 204 L.

Crops and Staging:

Barley, Wheat (spring, durum):

Apply from the 3 leaf to flag leaf stage (prior to head emergence).

Maximum one application per year of *Hat Trick* or other products containing clopyralid, MCPA or fluroxypyr.

Weeds, Rates and Staging:

Unless otherwise stated, apply when weeds are in the 2 to 4 leaf stage.

***Hat Trick* at 0.65 L per acre (one case treats 26 acres and 204 L treats 314 acres) controls:**

Canada thistle*
Chickweed
Cleavers
Dandelion*
Hemp-nettle
Kochia
Lamb's-quarters
Perennial sow-thistle*
Redroot pigweed*
Shepherd's purse
Wild buckwheat

***Hat Trick* at 0.85 L per acre (one case treats 20 acres and 204 L treats 240 acres) controls the above weeds plus:**

Canada thistle
Dandelion
Perennial sow-thistle
Redroot pigweed

* Lower infestation only.

Application Information:

Water Volumes: Minimum 40 liters per acre.

Nozzles and Pressure: Use 29 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage. Keep booms lower than 60 cm from crop canopy.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Extreme growing conditions such as drought or near freezing temperatures prior to, at and following time of application may reduce weed control and increase the risk of crop injury at all stages of growth. Wet foliage at the time of application may result in reduced weed control.

Tank Mixes:

Herbicides:
In barley and wheat (spring and durum) only:
*Achieve (label rate) plus adjuvant***
In wheat (spring and durum) only:
*Simplicity (0.2 L/acre) plus surfactant**

* Low rate of *Hat Trick* only.

** High rate of *Hat Trick* only.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Hat Trick* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No specific recommendation. May be up to 8 hours. Contact the manufacturer for more information.

Re-entry Interval: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or feed treated crop to livestock within 7 days of application. Withdraw meat animals from treated fields 3 days prior to slaughter.

Pre-harvest Interval: Leave 60 days between application and harvest.

Re-cropping Interval: Canola, flax, oats, rye and registered crops may be seeded the season after application.

Aerial Application: Apply by ground equipment only.

Storage: Store in original containers in a secure, dry heated storage. If product is frozen, bring to room temperature and agitate before use.

Buffer Zones:

Crop	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	1	0	1

See the key to product pages on page 27 for an explanation of the different habitats.

* **Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest Management Regulatory Agency web site.**

† Distance is measured from the downwind edge of the boom to sensitive areas.

Spray when winds are under 8 km/hr, but not dead calm.

Tank Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on page 15 to 16. The addition of detergent may improve the effectiveness of tank cleanout.

Hazard Rating:

⚠ Warning – **Eye and Skin Irritant**

For an explanation of the symbols used here see page 11.

Heat

Herbicide Group
14 - saflufenacil
(Refer to page 45)

Company:

BASF Canada

Formulation:

Heat WG **(PCP#29368):** 70 % saflufenacil formulated as a water soluble granule.
Container size - 8 x 844 g containers per case.

Heat LQ **(PCP#31468):** 342 g/L saflufenacil formulated as a suspension concentrate.
Container size - 1 x 1.73 L *Heat LQ*; 2 x 8.1 L *Merge* adjuvant.

Crops, Rates and Staging:

Prior to the seeding of; or following seeding and prior to the emergence of the following crops; fallow or post-harvest:
Must be applied as part of a tank mix with glyphosate from 180 to 360 g ae per acre (see glyphosate page for specific product rates):

CROP	RATE (per acre)	
	Heat WG (g)	Heat LQ (mL)
Barley, canaryseed, chickpea, corn (field and sweet[*]), field pea, oat, wheat (spring, winter and durum)	10.4 to 28.4	21.4 to 59
Bromegrass, seedling, grown for seed[**]	10.4 to 28.4	NR[***]
Lentil[†], soybean[†*]	10.4	21.4
Fallow and post-harvest	10.4 to 28.4	21.4 to 59

[*] Some varieties may be more sensitive to *Heat* and injury may occur

[†] DO NOT use rates higher than 10.4 g per acre of *Heat WG* or 21.4 mL per acre of *Heat LQ* or injury could result.

[**] *NOTE: Since this use registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility of herbicide performance.* ***Application to this crop is at the risk of the user.***

[***] NR, not registered.

Add either *Merge* or *Amigo* adjuvant or *MSO Concentrate* (*Heat WG* only) at 0.2 to 0.4 L per acre

(One 844 g container of *Heat WG* or one 1.73 L container of *Heat LQ* treats 80 to 30 acres)

Harvest Aid/ Desiccation:
Apply 14.4 to 28.4 grams per acre of *Heat WG* or 29.5 to 59 mL per acre of *Heat LQ* to speed the rate of dry down of the following crops and green weedy material.

Merge adjuvant or *MSO Concentrate* (*Heat WG* only) must be added spray solutions of both formulations at 0.2 to 0.4 L per acre. The required delay before harvest of each crop is indicated below.

CROP	PRE-HARVEST INTERVAL	APPLICATION STAGE
Barley[††], triticale[††], and wheat (spring, winter and durum)[††]	3	Hard dough stage - when a thumbnail impression remains on seed (less than 30% moisture)
Canola	3	Apply when 60 – 75% of seeds have changed colour.
Field Pea	3	A majority of the pods are brown (70 – 80%)
Red lentil varieties only	3	Lower most pods (15%) are brown and rattle when shaken
Dry bean	2	Stems are green to brown, pods are mature (yellow to brown), and 80 – 90% of leaves have dropped
Soybean	3	
Sunflower	7	The backs of flower heads and bracts are turning yellow, and seed moisture is 20 – 30%.

[††] *Heat LQ* only

Apply *Heat WG* at 28.4 g/acre or *Heat LQ* at 59 mL/acre with 0.4 L/acre *Merge Adjuvant* when the product is not used as part of a tank mix.

Heat may be tank mixed with glyphosate on field pea, lentil, dry beans and soybeans for additional pre-harvest weed control. When tank mixing with glyphosate, it is recommended to apply *Heat WG* at 20.4 g/acre or *Heat LQ* at 42.8 mL/acre. DO NOT tank mix with glyphosate when the harvested grain is to be used for seed.

Note: Tolerances for *Heat* residue may not be established in all countries importing wheat. Check with your grain

buyer prior to application to wheat to determine if they will accept these crops treated with *Heat*.

Weeds, Rates and Staging:

Apply up to the 8 leaf stage unless otherwise indicated to control the weeds controlled by glyphosate plus rapid burndown of:

Canada fleabane
Cleavers (4 whorl stage)
Dandelion
Kochia (up to 15 cm)
Lamb's-quarters
Flixweed
Narrow-leaved hawk's beard
  (up to 8 cm)
Pigweed (redroot)**
Ragweed (common)***
Round-leaved mallow
Stinkweed**
Volunteer canola**
Wild buckwheat **
Wild mustard**

* All varieties

** Applications at the 28.4 g per acre rate of *Heat WG* or 59 mL per acre rate of *Heat LQ* will also provide suppression of the emergence of these weeds following application.

*** Pre-harvest application of *Heat LQ* provides burndown of common ragweed in barley, triticale and wheat.

Application Information:

Water volume:

Preseed, pre-emergent, fallow or post-harvest by ground only: 20 to 40 L per acre.

Harvest aid/Desiccation:

Ground: 81 L per acre

Aerial: 20 L per acre.

Higher volumes are required for dense weed stands. Weed control improves with the amount of coverage.

Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** classification droplets. Low drift nozzles may require higher pressures for proper performance. Higher pressures may be required to penetrate dense weed stands.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Rainfall shortly after application can result in slight injury to the crop. See the 'Restrictions' section below for more details. Warm, moist growing conditions promote active weed growth. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Herbicides:

Preseed, pre-emergent, fallow or post-harvest:

Glyphosate (180 g to 360 g ae per acre)*

* must be mixed with glyphosate.

Harvest Aid/Desiccation:

Glyphosate (360 g ae per acre)†

† NOT for use on crops to be used for seed.

(see glyphosate page for product concentrations and equivalent application rates)

Fungicides: None registered

Insecticides: None registered

Fertilizers: None registered

Note: The above mixes are those listed on the *Heat* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall shortly after application can result in slight injury to the crop. Lentils are more sensitive to injury on coarse textured (sandy or gravely) and low organic matter soils. Injury will appear as slight leaf edge burning, which will be grown out of and yield will not be affected.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Preharvest Interval:

Preseed and pre-emergent: Leave 60 days between application and harvest.

Harvest Aid/Desiccant: Refer to table in 'Crops, Rates and Staging' section.

Grazing Interval:

Preseed and pre-emergent: DO NOT graze or cut cereal crops for feed within 30 days of application or chickpea, corn, field pea, lentil and soybean within 60 days.

Harvest aid/Desiccant: DO NOT graze or feed dry bean, lentil or soybean. Treated barley, field pea, triticale and wheat may be grazed or used as feed.

Re-cropping:

CROP	APPLICATION RATE (per acre) AND TIMING		
	Spring Application		**Pre-harvest Application**
Heat WG rate	**10.4 g**	**up to 28.4g**	**up to 28.4g**
Heat LQ rate	**21.4 mL**	**up to 59 mL**	**up to 59 mL**
Barley	PB	PB	1
Canary seed	PB	PB	1
Canola	1	1	1
Chickpea	PB	PB	1
Corn	PB	PB	1
Dry Bean	1	1	2
Flax	1	1	1
Lentil	PB	1	1
Mustard	1	1	1
Oat	PB	PB	1
Field Pea	PB	PB	1
Soybean	PB	1	1
Spring Wheat (including durum)	PB	PB	1
Winter wheat	PB	PB	1

PB May be planted back in the same season
1 May only be planted the season following application
2 May only be planted the second season following application

Aerial Application: May be applied by aircraft for desiccation use only. DO NOT apply by air for any other use.

Storage: Store in dry, cool storage. May be frozen.

Buffer Zones:

Application method	Crop	Buffer Zones (metres†) Required for the Protection of Terrestrial Habitat
Ground only*	Lentil, Soybean	3
	All other crops	10
Fixed wing airplane	All desiccation uses	175
Helicopter	All desiccation uses	150

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as meters from the downwind edge of the spray boom to sensitive habitat.

DO NOT apply in areas where surface water from the treated area can run off to adjacent cropland, streams

Sprayer Cleaning:

Heat can cause injury to sensitive crops at very low concentrations. Sprayers used to apply this product should be flushed out immediately after each day of use.

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution – Possible Skin Irritant

For an explanation of the symbols used here see page 11.

Imazamethabenz

Herbicide Group
2 - imazamethabenz
(Refer to page 45)

Company:

Nufarm Agriculture (*Assert 300SC* - PCP#21032)
Loveland Products Canada (*Avert* - PCP#29618)

Formulation:

300 g/L imazamethabenz formulated as a suspension concentrate.
Container size - 2 x 10.8 L.

pH adjuster: 94.5% sodium bisulfate formulated as a soluble granule.
Container size - 2 x 2.5 kg bags (1 bag per 10.8 L jug of ***imazamethabenz***).

Crops, Rates and Staging:

pH adjuster: 1 packet per jug of Assert to be used.

***Imazamethabenz* up to 0.67 L per acre (16.1 acres per jug):**
Barley, spring wheat (including durum) - 1 to 6 leaf stage.
Annual ryegrass (seed production only) - 4 to 6 leaf stage.

***Imazamethabenz* at 0.34 L per acre (32 acres per jug):**
Sunflower - plants (not under drought stress) that are in the 2 to 8 leaf stage. Crop must be less than 15 inches (38 cm) tall except for semi-dwarf varieties, which must be less than 12 inches (30 cm), and dwarf varieties, which must be less than 4 inches (10 cm). Stunting and head deformation can occur from applications made beyond recommended stages.

DO NOT apply *imazamethabenz* to the same field more than once in two years.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions. Refer to the product label for complete mixing instructions.
A general guide to mixing can be found on page 14.

Weeds, Rates and Staging:

WEEDS	STAGE	RATE	
		(L per acre)	Acres per 10.8 L jug
Stinkweed Wild mustard	Up to 6 leaves	0.34	32
Weeds above plus: Buckwheat (wild and tartary) (suppression) Volunteer canola (except Clearfield varieties)	Up to 4 leaves	0.54	20
Wild oats	1 to 3 leaves		
Wild oats	1 to 4 leaves	0.67	16

* Main stem leaves.

Application Information:

Good coverage of foliage is important to maintain good control

Water volume: In cereals only, *imazamethabenz* may be applied in 20 to 40 L of water per acre when applied alone or when tank mixed with *dichloroprop/2,4-D, 2,4-D ester,* or *MCPA ester*. For all other applications, apply in 40 L per acre.

Nozzles and Pressure: 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets or larger.

Screens: Use 50 mesh screens for nozzles and in-line filters.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply *imazamethabenz* 24 hours before or after a frost. It works best at warm temperatures. Performs relatively consistently under dry conditions. If cold, wet soil conditions persist in the days after application, retillering of wild oats may occur. DO NOT apply to drought stressed sunflowers.

Tank Mixes:

Herbicides:

Imazamethabenz may be applied at either 0.53 L or 0.67 L per acre in tank mixes in the brown and dark brown soils, but must be applied at 0.67 L per acre when tank mixing in the black and grey wooded soils for adequate wild oat control.

In spring wheat (including durum) and barley:

*2,4-D Ester** (up to 212 g ae / acre)
Curtail M (0.80 L / acre)
Dichlorprop/2,4-D ester (0.7 L / acre)*†
*Fenoxaprop*** (0.118 L / acre)
*Fenoxaprop*** (0.118 L / acre) + *MCPA Ester* (0.28 L / acre)
*Fenoxaprop*** (0.118 L / acre) + *Refine SG* (12 g / acre)
Frontline XL (0.65 L / acre)
Infinity (0.33 L / acre)
*MCPA Ester** (up to 0.38 L / acre) (600 g / L formulations)
Refine SG (12 g / acre)
Refine SG (12 g / acre) + *MCPA Ester* (0.28 L / acre)
Spectrum (20 acres per case)
Trophy (20 acres per case)

† Mix with *Turboprop* is NOT for use in barley. *Dichlorprop-D* registered with *Assert* only.

* Apply in 20 to 40 L of water per acre. For all other tank mixes use 40 L / acre.

** Use the 0.54 L / acre rate of *imazamethabenz* when tank mixing with *fenoxaprop* (see product labels for specific products). *Fenoxaprop* rate provides green foxtail control only.

*** When tank mixing dry broadleaf products, add products to the tank in the following order: dry broadleaf products, acidifier, *imazamethabenz*, and other liquid herbicides if required. For repeat tanks, dry broadleaf products need to be mixed with water to form a slurry prior to adding to the remaining spray solution in the tank.

Refer to *imazamethabenz* labels for specific mixing order and application details when tank mixing.

Refer to tank mix partner for additional crop staging restrictions.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *imazamethabenz* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours will reduce control.

Re-entry: Wait at least 12 hours before entering treated fields.

Grazing: DO NOT graze treated fields or cut treated forage for silage or hay. Mature barley and wheat grain or straw from fields treated with *imazamethabenz* can be fed to livestock. DO NOT feed or graze treated annual ryegrass.

Preharvest Interval: DO NOT apply beyond the recommended crop stage.

Re-cropping:

DO NOT apply imazamethabenz to the same field more than once in two years.

Year After Application	Black and Grey Wooded Soils	Brown and Dark Brown Soils
Year 1	Spring wheat (including durum), barley, canola, field peas, flax, sunflowers	Spring wheat (including durum), CLEARFIELD canola, barley, sunflowers
Year 2	Spring wheat (including durum), barley, canaryseed, canola, field peas, flax, oats, sunflowers	

Conduct a field bioassay (a test strip grown to maturity) the **year before growing any crop not listed in the table. Lentils** are known to be particularly sensitive to *imazamethabenz* residues in the soil. The additive effect of soil residues from the use of *imazamethabenz* and sequential applications of *imazethapyr*, *metsulfuron*, or *Odyssey* herbicides on the same land area has not been determined. Crop rotation guidelines are not known and injury to rotational crops other than wheat (excluding durum) may occur. Plant only wheat (excluding durum) on fields where these herbicides have been used until a field bioassay demonstrates other crops can be grown successfully.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Shake well before using.

Buffer Zones:

CROP	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Sunflower	0	0	1
Annual ryegrass, Cereals	1	0	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

▽ Caution – Poison

◇ **Warning – Eye Irritant**

For an explanation of the symbols used here see page 11.

Imazethapyr

Herbicide Group

2 - imazethapyr

(Refer to page 45)

Company:

BASF Canada (*Pursuit* - PCP#23844)

Farmers of North America (*MPower Kamikaze* - PCP#30127)

ADAMA Canada (*Phantom* - PCP#30017)

Univar Canada (*Gladiator* - PCP#28923)

Loveland Products Canada (*MultiStar* - PCP#29259)

Formulation:

240 g / L imazethapyr formulated as a solution.

Container size - 2 x 3.3 L jugs per case.

Crops and Staging:

All products: DO NOT use in the brown or dark brown soil zones (except for use in dry bean and alfalfa under irrigated brown soils); rotational crops may be severely injured due to carry over in these soils.

CROP	STAGE
Field pea	May be applied up to the sixth above-ground node stage (6 true leaves).

***Pursuit*, *Gladiator*, *MultiStar* and *Phantom* only:**

CROP	STAGE
Dry bean (pinto, pink and red varieties only)	Up to and including the second trifoliate leaf stage
Soybean (Manitoba only)	Up to and including the third trifoliate leaf stage
Seedling alfalfa (forage or seed production)*	Apply after the first trifoliate leaf stage.
Established alfalfa (seed production only)**	Apply before alfalfa reaches 12 inches (30 cm) in height.
Chickling vetch grown for seed	Apply at the 5 to 7 leaf stage.

* Apply only to seedling alfalfa that will remain in production for at least 3 years following application. Apply only once during the life of the alfalfa stand.

** DO NOT apply in the last year of established alfalfa stands.

Weeds and Staging:

In field peas. Apply up to the 4 leaf stage, unless otherwise indicated:

Chickweed
Cleavers
Green foxtail
Hemp-nettle
Redroot pigweed
Shepherd's-purse
Smartweed
Stinkweed
Volunteer canola (not CLEARFIELD varieties)
Wild buckwheat†
Wild mustard
Wild oats † (2 to 4 leaf stage)

In seedling and established alfalfa:

Common groundsel*†
Green foxtail†
Green smartweed *
Redroot pigweed
Shepherd's-purse*†
Stinkweed
Volunteer canola (not CLEARFIELD varieties)
Wild mustard

In dry bean:

Hairy nightshade (up to 6 leaf stage)

* Seedling alfalfa only.

† Suppression

Rates:

85 mL per acre (40 acres per jug).

A non-ionic surfactant with at least 80% active ingredient (*Agral 90, Agsurf II, Surf 92*) should be added at a rate of 0.25 **L per 100 L of spray solution.** DO NOT over apply *imazethapyr*, as crop injury may result.

DO NOT apply *imazethapyr* more than once per season or follow *imazethapyr* with other products containing imazethapyr in the same year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 to 160 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when **using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use** nozzles and pressure designed to deliver proper coverage with ***ASABE medium*** droplets or larger.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is **adequate for rapid growth. Under cool or dry conditions,** control of some weeds may be severely reduced.

Tank Mixes:

None registered.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval may be up to 8 hours. Contact manufacturer** for more information.

Re-Entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or harvest seedling alfalfa within 14 days of treatment. DO NOT graze or harvest field peas for feed within 30 days. DO NOT graze other treated crops or cut for feed prior to crop maturity.

Preharvest Interval: DO NOT apply within 60 days of harvesting field peas or chickling vetch, within 75 days of harvesting dry beans, or within 85 days of harvesting soybeans.

Re-cropping: Rotate to barley, spring wheat (not durum), **lentils, alfalfa, field pea or CLEARFIELD canola the year** following application. The manufacturer recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crop other than those listed above. However, yield losses within the test strips may not be noticed unless the yield can be compared to an untreated area seeded adjacent to the *imazethapyr* treated strip. In case **of crop failure, only field peas or CLEARFIELD canola may** be replanted in the year of application.

NOTE: Breakdown of imazethapyr *may be slowed or delayed by environmental conditions such as drought, excessive cold and/or acid soils (pH less than 6.5) resulting in an increased risk of injury to rotational crops. The most tolerant crops are CLEARFIELD canola and legume crops, then cereals. Contact manufacturer for additional information on re-cropping intervals (1-877-3712273).*

Aerial application: DO NOT apply by air.

Storage: DO NOT freeze. If the product is exposed to temperatures below 0°C, thaw the product completely and shake the container vigorously prior to use.

Buffer Zones:

Pursuit, MultiStar, Gladiator:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only*	1	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured is metres from the downwind edge of the spray boom to sensitive habitat.

Other Products: DO NOT apply within 15 m of shelterbelts, water bodies, wetlands, and woodlots.

Sprayer Cleaning:

There are no specific sprayer cleaning directions on the product label. The use of 'Method C' in the general section on sprayer cleaning on pages 15 to 16 is recommended for other products with similar chemistry. Contact the manufacturer for more information.

Hazard Rating:

▽ Caution - May cause skin irritation

▽ Caution - May cause eye damage

For an explanation of the symbols used here see page 11.

Impact (this referring text to be removed in the 2018 edition)

See topramezone on page 306.

Inferno Duo

Herbicide Group

2 - flucarbazone, tribenuron

(Refer to page 45)

Company:

Arysta LifeScience Canada (PCP#30663)

Formulation:

45% flucarbazone and 25% tribenuron formulated as a water dispersible granules.

Container size - 4 x 254.5 gram pouches.

Crops and Staging:

Spring wheat (NOT including durum):

Apply to the soil surface from one week before seeding until crop emergence.

Weeds, Rates and Staging:

Apply 12.75 g per acre of *Inferno Duo* (one 254.5 g pouch treats 20 acres) plus 180 g ae per acre of glyphosate IPA or K+ salts (see glyphosate page) to control:

Weeds controlled by glyphosate at 180 g ae/acre (see glyphosate page) plus:

Cow cockle
Dandelion†
Foxtail barley (up to 10 cm)*
Narrow-leaved hawk's-beard
Shepherd's-purse
Volunteer canola***
Wild oats†

Mix with glyphosate at 360 g ae per acre to control:

Foxtail barley (greater than 10 cm, heavy infestations or stressed plants)*

* Apply prior to seed head emergence and the loss of older leaves.

† Suppression only.

NOTE: The entire 254.5 g pouch must be added to the spray tank. DO NOT use part pouches. DO NOT apply more than 6.1 g active flucarbazone per acre per growing season (equivalent of 13.5 g / acre of *Inferno Duo* or 15.4 mL / acre of *flucarbazone 2.0* formulations) .

Application Information:

Water Volume: 40 L per acre.
Nozzles and Pressure: Use 30 to 50 psi (200 to 345 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop tolerance and weed control may be reduced if applications are made to plants growing under stress. Stress includes saturated or water-logged soil, drought, extreme temperatures, low fertility or visible disease symptoms at application. Adopting practices to increase crop vigor will improve crop tolerance.

Tank Mixes:

Herbicides:
Glyphosate IPA or K+ salts only.

Fertilizers: None.

Insecticides: None

Note: The above mixes are those listed on the *Inferno Duo* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: DO NOT apply if rainfall is expected within 1 hour of application.

Re-entry: Wait at lest 12 hours before re-entering treated fields.

Grazing: DO NOT graze treated fields. Mature grain or straw may be fed to livestock.

Preharvest: Leave at least 80 days from application to harvest.

Re-cropping Interval: The following crops may be planted 11 months after application.

Soil Zones and Rotational Crops			
Grey-Wooded	**Black**	**Dark Brown**	**Brown**
Spring Wheat **Barley** Canola (all varieties) **Field Pea***	Wheat (Spring & durum) **Barley** Canola (all varieties) **Field Pea*** Flax **Field Bean**	Wheat (Spring & durum) **Barley** Canola (all varieties) **Field Pea*** Flax	Spring Wheat

* **Field peas may be grown the year following** application **in fields where precipitation has been equal to or above** the 10 year average during the growing season, and where organic matter content is above 4%, and pH is below 7.5. The company suggests a minimum of 100 mm (4 inches) of rain is needed in the 60 days following application for **adequate breakdown to take place.**

NOTE: Other rotational crops may also be affected if rainfall is less than the 10 year average for the area. Soils in the grey wooded, black and dark brown soil zones with a combination of low organic matter (less than 2%), light textured soils or high pH (greater than 7.5) (i.e. eroded knolls, sandy soils) may result in delayed growth and development in rotational crops. Do not plant crops other than those listed above in the year following application.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones: Leave at least 20 **m from the downwind** edge of the spray swath to sensitive upland plants like shelterbelts and woodlots and at least 35 m to water sources or wetland habitats. Avoid drift onto sensitive crops like canola and tame oat. DO NOT mix or load within 10 m of water sources or wetland habitats.

Sprayer Cleaning:

Inferno Duo residues in the spray tank can cause severe injury to sensitive crops at very low concentrations. Sprayers should be cleaned out immediately before using another product.

Refer to 'Method A' in the general section on sprayer cleaning on pages 15 to 16.

When mixing with other pesticides, combine the method **above with the method required for the tank mix partner if** it is different from above.

Hazard Rating:

◇ Warning: Contains the allergen milk and sulphites.

▽ Caution – Skin irritant.

For an explanation of the symbols used here see page 11.

Infinity

Herbicide Group
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Bayer CropScience (PCP# 28738)

Formulation:

37.5 g / L pyrasulfotole and 210 g / L bromoxynil formulated as an emulsifiable concentrate.

Container size – **2 x 6.7 L jugs per case.**

Crops and Staging:

The following crops may be treated when at the 1 leaf stage of growth until the flag leaf is just visible but still rolled:

Barley
Perennial ryegrass * **(seedling** & established, grown for seed or forage)
Red fescue and bromegrass * (established, grown for seed or forage)
Timothy (seed production only)
Triticale
Wheat (spring, durum, winter)

* *NOTE: Since the uses on forage grasses were registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Those who apply this use do so at their own risk.***

Weeds, Rates and Staging:

At 0.33 L per acre (one case treats 40 acres) the following weeds are controlled at the 1 to 6 leaf stage unless otherwise noted:

Annual sow-thistle
Chickweed
Canada fleabane (seedlings **up to 10 cm)***
Canada Thistle† (up to 30 cm)
Cleavers (1 to 3 whorls)
Cleavers (4 to 6 whorls)*
Dandelion† (up to 25 cm across††)
Flixweed (up to 10 cm)
Hemp nettle
Kochia (up to 10 cm)
Lamb's-quarters
Narrow leaved hawk's-beard (up to 10 cm before bolting)
Pale smartweed
Ragweed (common, giant†*)
Perennial sow-thistle†
Redroot pigweed
Round leaved mallow†
Russian thistle (up to 10 cm)
Shepherd's-purse
Spreading atriplex (up to 10 leaf)†*
Stinkweed
Stork's-bill (up to 8 leaf)***
Volunteer canola**
Wild buckwheat
Wild mustard

† Suppression only.

†† Spring seedlings and overwintered rosettes.

* **Add 200 g of active ammonium sulphate per acre (202 g/acre of 99% dry; 0.5 L/acre of 40% liquid; or 0.4 L/acre of 49% solution).**

** **All herbicide tolerant varieties.**

*** **Only when mixed with 2,4-D + ammonium sulphate.**

DO NOT apply *Infinity* or other products containing pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

Water Volume:

Ground: **Minimum 19 L per acre**
Aerial: **Minimum 11.4 L per acre**

Higher water volumes should be used under dense crop and weed canopies to ensure thorough coverage of the target weeds.

Nozzles and Pressure: Maximum 40 to 45 psi (275 to 310 **kPa) with conventional flat fan** nozzles. **Use nozzles and** pressure designed to deliver proper coverage with ***ASABE medium*** droplets. Angle ground sprayer nozzles forward at a 45° angle to improve coverage of vertical leaf targets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

For best results, apply to emerged, young, actively growing **weeds according to the weed stages listed. Under stressed conditions and/or heavy crop canopy, early application** will result in improved weed control. Weeds growing under adverse environmental conditions such as drought will be less susceptible herbicide effects

Tank Mixes:

Herbicides:

Wheat (spring, winter, and durum), barley and triticale:
Liquid Achieve (0.2 L/acre) plus *Turbocharge* adjuvant

Wheat (spring and durum) and barley only:
Puma Advance (206 to 412 mL per acre)
2,4-D Ester (113 g ae/acre) + Ammonium sulphate (see Rates:)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: DO NOT mix with fertilizers other than those indicated above.

Note: The above mixes are those listed on the *Infinity* label only.

Bayer also supports the following mixes that are not on the *Infinity* label. Apply mixes according to the most restrictive use limitations for either product:
Herbicides: *2,4-D Ester* (56-112 g ae/acre), *Axial+Tilt, Horizon NG, Lontrel, MCPA 600 Ester* (94.5 to 189 mL/acre), *Puma Advance + Tilt, Traxos, Varro, Traxos+Tilt.*
Fungicides: *Tilt.*
Insecticides: *Decis, Sevin XLR.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-entry: DO NOT re-enter treated area within 12 hours.

Grazing: DO NOT graze treated crops or cut for hay within 25 days of application.

Preharvest Interval: Leave at least 50 days for wheat and triticale and 45 days for barley from application to harvest of grain or straw.

Re-cropping: Alfalfa, barley, canaryseed, canola, field corn (Manitoba only), flax, potatoes, soybeans (Manitoba only), sunflowers, tame oat, and wheat (durum, spring) may be seeded the year following application. Field peas may be grown the season following application in black, grey wooded and dark brown soil zones. *DO NOT plant field peas the season following Infinity use in the brown soil zone where organic matter content is below 2.5 % and where soil pH is above 7.5.* Lentils may be seeded the second season after application.

Aerial Application: May be applied by air.

Storage: Store product in original containers in a secure, dry area, away from other pesticides, food or feed above -20°C. If stored over winter, shake or mix well before using.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5
Fixed wing airplane	10	1	375
Helicopter	10	1	225

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

The manufacturer recommends a cleanout process similar to "Method A" on page 15 using a combination of water and ammonia solution rinses.

For additional information, Refer to page 15.

Hazard Rating:

Warning - Warning Poison

Warning – Eye and Skin Irritant.

Warning - Contains the allergen soy.

For an explanation of the symbols used here see page 11.

Kerb

Herbicide Group
15 - propyzamide
(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

Kerb 50WP **(PCP#25595):** 50% propyzamide formulated as a wettable powder. Container size - 1.36 kg (3 x 454 g water soluble pouches).

Kerb SC **(PCP#30264):** 400 g/L propyzamide formulated as a suspension concentrate.

Container size - 2 x 10 L.

Crops and Staging:

Apply to the following established crops between October 1 and freeze-up or very early spring*. Temperatures should be above freezing at time of application but should not exceed 12°C after application or a reduction in control may be observed. Applications are more effective if followed by a rain. Contact manufacture for specific staging and application guidelines prior to application.

Established alfalfa, bird's-foot trefoil, and established pastures**.

* **Early spring application for seed alfalfa only.**

** *Severe stand thinning* may occur to pastures consisting primarily of crested wheatgrass, meadow fescue and timothy. Some thinning (10 to 15%) may occur with tall fescue and creeping red fescue.

Weeds, Rates and Staging:

Apply in late fall or very early spring (seed alfalfa only) prior to the emergence of weeds.

Established grass or grass/legume pastures for control of foxtail barley:

Brown, dark brown or gray wooded soils:

Kerb 50WP: 0.36 kg per acre.

Kerb SC: 0.45 L per acre.

Black soils:

Kerb 50WP: 0.45 kg per acre.

Kerb SC: 0.56 L per acre.

Established Alfalfa[†] and bird's foot trefoil[†]:

WEED	RATE (kg/acre)	
	Kerb WP	***Kerb SC***
Annual grasses, volunteer cereals, wild oat	0.71 kg[†]	0.89 L[†]
Quackgrass, orchardgrass, timothy, chickweed	0.91 to 1.32[*] kg	1.13 to 1.62[*] L
Dodder (fall application only)	1.3 kg	1.62 L

Note that complete control may not be achieved.

[*] **Maximum** 0.91 **kg per acre**[†] Including fall application on **spring seeded crops. with spring application. Low temperatures and adequate moisture following application** are needed for efficacy.

[†] Including fall application on spring seeded crops.

Caution: DO NOT use on soils with more than 6% organic matter. DO NOT apply to soils prone to flooding. DO NOT apply to pastures that contain high proportions of timothy, crested wheat grass or meadow fescue. Consult the manufacturer for other forage grass species sensitivities to *Kerb*.

Application Information:

Water Volume: 120 to 200 L per acre.

Nozzles and Pressures: Maximum 30 to 40 psi (200 to 275 kPa) **with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance.** Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Dry soil conditions at time of weed emergence may result in reduced control. Approximately 3 inches of total precipitation **is required for adequate activation. Best results when** soil temperatures are low but above freezing.

Tank Mixes:

None Registered

Restrictions:

Rainfall: Surface applications are most effective if followed by 0.5 to 1 inch (1.25 to 2.5 cm) of rain within 2 days of application. Avoid application when heavy rain is forecast.

Re-entry: DO NOT re-enter treated areas for 24 hours.

Grazing: DO NOT graze or harvest for livestock feed **within** 90 **days of the** 1.32 **kg/acre rate of** *Kerb 50WSP* or **the** 1.62 **L/acre rate of** *Kerb SC*, and 60 days of application for lower rates.

Re-cropping: May be replanted to leafy vegetable crops after 30 days of treatment and root or tuber vegetables within 90 days of treatment. DO NOT re-plant to any other crops within 1 year of treatment.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. Do not freeze.

Buffer Zones: DO NOT contaminate domestic or natural water sources or wetlands.

Crop	**Buffer zone[*] (meters[†])** for terrestrial habitat
Established grass pastures, established grass / legume pastures, alfalfa or trefoil grown for seed	5

See page 36 for an explanation of the different habitats.

[*] **Buffer zones can be reduced by** 70% **when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

Kerb WSP:

Caution - Poison

For an explanation of the symbols used here see page 11.

Ko-Act

Herbicide Group
2- tribenuron
4- 2,4-D
(Refer to page 45)

This product is a prepackaged tank mix of *Spike* (Tribenuron, page 317) and 2,4-D (page 79). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Nufarm Agriculture

Formulation:

The *Ko-Act* package contains the following components:

***Spike* (PCP#30376):** 75% Tribenuron methyl, formulated as water dispersible granule.
Container size - 2 x 160 g

***2,4-D 700 ester* (PCP#27820):** 2,4-D 660 g/L as emulsifiable concentrate.
Container size - 2 x 8.69 L.

Crops and Staging:

Pre seed burn-off prior to seeding the following crops:

Barley
Wheat

May also be applied to chem fallow.

Weeds, Rates and Staging:

***Spike* at 4 g per acre plus 2,4-D 700 ester at 212 mL per acre.**

Weeds controlled up to 10 cm or 3 leaf rosette or less, unless specified, include:

Chickweed
Dandelion
Flixweed
Hemp nettle
Kochia*
Mustard
Narrow-leaved hawk's-beard
Shepherd's-purse
Volunteer canola*

* All biotypes

One case treats 80 acres.
Refer to the product label for complete mixing instructions.
A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:
Glyphosate (360 g ae per acre*)

* see glyphosate page for rate conversion

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Korrex

Herbicide Group
2 – florasulam
4 – dicamba
(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

The *Korrex* package contains two components:
Korrex A **(PCP#31405):** 25% florasulam formulated as water dispersible granules.
Container size: 2 x 809.37 g + measuring cup
Korrex B **(PCP#31205):** 480 g/L dicamba dimethylamine salt formulated as a solution.
Container size: 2 x 9.7 L jugs

Crops and Staging:

Barley, Durum, Oats, Spring Wheat, Winter Wheat:

Prior to seeding. No later than 48 hours after seeding and prior to crop emergence.

Weeds, Rates and Staging:

Korrex A **at 8.1 g per acre plus** ***Korrex B*** **at 97 mL per acre (one case treats 200 acres) must be mixed with glyphosate at 180 g ae per acre (see glyphosate page for product rates) to control:**

Weeds controlled by glyphosate at the rate above plus enhanced control of the following weeds:

Broadleaf weeds controlled at the 2 – 4 leaf stage:

- Annual sow thistle†
- Cleavers
- Chickweed
- Cow cockle
- Hemp-nettle
- Kochia
- Narrow-leaved hawk's-beard
- Scentless chamomile
- Shepherd's-purse
- Smartweed (including lady's-thumb)
- Stinkweed
- Volunteer canola*
- Wild buckwheat
- Wild mustard

† Suppression only

* Including all herbicide-tolerant canola varieties.

Korrex may also be mixed with glyphosate at rates up to 1000 g ae per acre to control weeds controlled by glyphosate at these rates (see glyphosate page).

Note: Maximum one application of this product of other products containing florasulam in back to back years.

Refer to the product labels for complete mixing instructions for these products. A general guide to mixing can be found on page 14

Application Information:

Water Volume: Use a minimum of 20 to 40 L per acre

Nozzles and Pressure: Maximum 22 psi (150 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Korrex A: Warm, moist growing conditions promote active weed growth and enhance activity. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re growth may occur.

Korrex B: Crop damage (stunting, reduced seed set) can occur if the chemical is applied at any time other than the recommended stage. DO NOT apply to crop under stress from adverse environmental conditions, such as excess moisture, drought and disease. Apply when air temperature is between 10 and 25°C.

Tank Mixes:

Herbicides:
Prior to crop emergence:
Korrex must be mixed with *Glyphosate* (180 to 1000 g ae per acre – see glyphosate page for conversion* to product rates).

*All salt types.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Heavy rainfall immediately after application may wash the chemical off the foliage and a repeat treatment may be required. DO NOT apply if rainfall is forecast for the time of application. Consult manufacturer for more detail on the time period they support.

Re-entry: No specific re-entry period is indicated on the label. Other products with similar component indicated a minimum re-entry period of 12 hours.

Pre-harvest Interval: DO NOT harvest crops for 60 days from application.

Grazing: Livestock may graze the treated area 7 days after application.

Re-cropping: Registered crops may be seeded any time after treatment. Barley, canola, chickpeas, corn, dry beans, flax, lentils, mustard (brown, oriental, yellow, and oilseed quality *B. juncea* types), oats, peas, potato (except seed potato) soybeans, sunflower and wheat may be seeded the following season.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place in original container.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground	15	15	30

See the key to product pages on page 24 to 26 for an explanation of the different habitats.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Korrex A: Refer 'Method A' in the general section on sprayer cleaning on page 15 to16.

Korrex B: Refer to 'Method B' in the general section on sprayer cleaning on page 15 to16.

A combination of 'Method A' and 'Method B' is the best option. The use of All Clear or Clean-Out sprayer cleaners are also recommended as an alternative to the combination of methods above.

Hazard Rating:

Korrex A:

⚠ Warning – Eye Irritant.

Korrex B:

☠ Caution – Poison

⚠ Warning – Eye Irritant.

For an explanation of the symbols used here see page 11.

Liberty 150SN

Herbicide Group
10 - glufosinate
(Refer to page 45)

Company:

Bayer CropScience (PCP#28837)

Formulation:

150 g/L glufosinate ammonium formulated as a solution. Container sizes - 13.5 L, 108 L, 432 L.

Crops and Staging:

Liberty Link Canola - cotyledon to early bolting stage. Temporary crop discolouration (bronzing) may be observed after application.

Note: A valid Liberty and Trait Agreement is required to purchase Liberty 150SN.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

WEED	WEED STAGE (from emergence to stage)	RATE (L/ACRE)	ACRES PER 13.5 L
Cow cockle	4 leaf	0.54	25
Green foxtail	6 leaf (max. 3 tillers)		
Barnyard grass	4 leaf	0.81	16.6
Wild mustard	5 leaf		
Lamb's-quarters, smartweed (lady's-thumb)	6 leaf		
Stinkweed	8 leaf		
Volunteer flax	2.5 inches (6 cm)		
Russian thistle	3 inches (8 cm)		
Wild buckwheat	3 leaf	1.08	12.4
Redroot pigweed, round-leaved mallow, quackgrass*	4 leaf		
Light to moderate infestations† of volunteer wheat, volunteer barley*	4 leaf (max. 2 tillers)		
Hemp-nettle (1 to 3 leaf pairs), shepherd's-purse	6 leaf		
Common chickweed (max. 4 leaf pairs), sow-thistle	8 leaf		
Kochia	3 inches (8 cm)		
Canada thistle*, scentless chamomile	4 inches (10 cm)		
Cleavers	2 whorls (nodes)	1.35	10
Stork's-bill and heavy populations of wild buckwheat	3 leaf		
Quackgrass (light to moderate** or heavy infestations*)†, volunteer wheat, volunteer barley*, wild oat	4 leaf (max. 2 tillers except quackgrass)		
Hemp-nettle	8 leaf (1 to 4 leaf pairs)		
Dandelion rosettes	6 in. (15 cm) across		
Flixweed, Canada thistle*	4 inches (10 cm)		
Quackgrass***	4 leaf	1.6	8.3
Canada thistle**	4 inches (10 cm)		

* Temporary top growth control. Plants may return from surviving growing points.
** Extended top growth control.
*** Season long control.
† The company does not provide guidelines for weed densities. When in doubt as to the infestation level, use the high rate or contact the manufacturer.

Second Application:
A second application of up to 1.35 L per acre may be made to fields that were treated initially with *Liberty* to a maximum total combined rate of 2.97 L per acre (1.62 L + 1.35 L). DO NOT apply more than 2.97 L per acre of *Liberty* in one season.

Application Information:

Water Volume:
Ground applications: 45 L per acre.
Aerial applications: 22 L per acre.
Nozzles and Pressure:

Ground Application: Use 40 psi (275 kPa) when using conventional 80° or 110° flat fan nozzles; 45 psi (310 kPA) when using check valves. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium or larger*** droplets.

Aerial applications: DO NOT use raindrop nozzles. Use a combination of nozzles and pressure to provide ***ASABE coarse*** or larger droplet size distribution.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Liberty 150SN activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought, and low humidity conditions slow weed growth. Applications made under these stressed conditions may result in reduced weed control.

Tank Mixes:

Herbicides:
Clethodim (*Centurion* or *Select* only) 25.5 to 77 mL/acre plus *Amigo*.

Consult *Liberty 150SN* label for exact weeds controlled. For *Centurion* or *Select* tank mix add *Amigo* to the tank first followed by *Liberty* and then *Centurion* or *Select*. Consult label for specific mixing instructions

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Liberty 150SN* label only.

Bayer CropScience also supports the following mixes that are not on the *Liberty* label. Apply mixes according to the most restrictive use limitations for either product:

Insecticides: *Decis, Sevin XLR.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 4 hours may reduce control.

Re-Entry: DO NOT re enter treated areas for 24 hours after application, without protective clothing as for spraying.

Grazing: DO NOT graze the treated crop or cut for feed.

Re-cropping: No restrictions.

Aerial Application: May be applied by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground [*]	1	0	1
Fixed wing airplane or Helicopter	1	0	30

See page 36 for an explanation of the different habitats.

[*] **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT apply when dead calm or when winds exceed 16 **km/hr when using unprotected booms or applying by air, or exceeding 25 km/hr when using shrouded booms.**

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

◈ Warning – Poison

▽ Caution – Skin Irritant

◇ Warning – **Eye Irritant**

For an explanation of the symbols used here see page 11.

Liberty 200 SN

Herbicide Group
10 - glufosinate
(Refer to page 45)

Company:

Bayer CropScience (PCP#25337)

Formulation:

200 g/L of glufosinate ammonium formulated as a solution.

Container sizes - 10 L

Crops and Staging:

***Liberty 200 SN* tolerant Corn only:** 1 to 8 leaf stage. Refer to product label for appropriate method of determining crop leaf stage.

***Liberty* tolerant soybean varieties only:** up to the start of flowering and prior to canopy closure.

Weeds Rates and Staging:

Weeds controlled with 0.61 L per acre rate

WEED	WEED STAGE (from emergence to stage)
Cocklebur	4 leaf
Green foxtail, Proso millet, Ragweed	5 leaf
Redroot pigweed, Shepherd's-purse	6 leaf
Chickweed	8 leaf

Weeds controlled with 0.81 L per acre rate

WEED	WEED STAGE (from emergence to stage)
Perennial sow-thistle, wild buckwheat, wild mustard, wild oat, Yellow foxtail	4 leaf
Barnyard grass, eastern black nightshade	5 leaf
Canada thistle*, field bindweed*, lady's-thumb, lamb's-quarters, wormseed mustard	6 leaf
Ragweed	7 leaf
Stinkweed	8 leaf

* season long suppression.

Weeds controlled with 1.0 L per acre rate

WEED	WEED STAGE (from emergence to stage)
Quackgrass**	4 leaf

** season long suppression, apply with ammonium sulphate, 2.4 L per acre (49% solution) or 1.2 kg per acre (99%).

Second Application:
A second application may be made to fields treated initially with up to 1 L per acre, if weeds and crop are at the correct leaf staging. DO NOT apply more than 2 L per acre *Liberty 200SN* to a crop in a single season.

Split Application Program:
For season long control of the weeds above a split application of *Liberty 200SN* may be employed. The first application must be a minimum of 0.81 L per acre made at the correct weed staging. For the second application of a 0.51 L per acre rate may be used. The second application timing must be made as soon as the second flush of weeds occurs and before the maximum leaf stage for the crop.

Application Information:

Water Volume: A minimum of 45 L per acre.

Nozzles and Pressure: Use 25 to 40 psi (175 to 275 kPa) when using conventional 80° or 110° flat fan nozzles. Angle nozzles forward at 45° to improve coverage of vertical leaf surfaces. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Liberty 200SN activity is influenced by environmental conditions. Cool temperatures (less than 10°C), drought and low humidity conditions slow weed growth. Applications made under these stress conditions may result in reduced weed control.

Weed control may also be reduced when heavy dew, fog, or mist are present at the time of application.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Within 4 hours of application may reduce control.

Re-Entry: DO NOT re-enter treated areas for 24 hours after application, without protective clothing as for spraying.

Grazing: DO NOT graze treated fields within 20 days of application.

Preharvest Interval: Leave 86 days between application and corn harvest, and 70 days for soybean.

Re-cropping: No re-cropping restrictions the year after treatment.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments **are exempt from buffer zone requirements.**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack applications do not require a buffer.

Sprayer Cleaning:

Refer to 'Method C' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Caution - Poison

Caution - Skin Irritant

Warning - Eye Irritant

For an explanation of the symbols used here see page 11.

Linuron*

Herbicide Group
7 - linuron
(Refer to page 45)

Company:

Tessenderlo Kerley Inc. (*Lorox L*)

Loveland Products Canada (*Linuron 400*)

The following recommendations are a blend of recommendations of all linuron products. Consult the individual product labels for specific recommendations.

** NOTE: The Pest Management Regulatory Agency has re-evaluated linuron products and have proposed to phase out the use of all linuron products. As a result of this phase out, this page may not appear in future editions of this publication.*

Formulations:

Linuron 400 **(PCP#15544):** 400 g/L linuron formulated as a suspension concentrate.
Container size - 10 L.

Lorox L **(PCP#16279):** 480 g/L linuron formulated as a suspension concentrate.
Container size - 10 L.

Crops, Rates and Stages:

Post-emergent applications only:

CROP	STAGE	LINURON 400 (L/acre)	LOROX L (L/acre)
Spring wheat (including durum), oats and barley*	2 to 4 leaf stage	0.20 to 0.26	0.17 to 0.22
Field corn (post-emergent** directed spray, do not spray over top of corn)	Apply when corn is at least 15 inches (38 cm) high (highest leaf on free standing plant)	1.16 to 2.18	0.97 to 1.82
Caraway, coriander	Apply when in the 2 to 4 leaf stage	—	0.50 to 0.67
Dill†	Apply when dill has at least 2 full leaves developed	—	0.77 to 1.9
Shelterbelts (caragana, green ash, Siberian and American elm, Manitoba maple, poplar, willow, white spruce, Colorado spruce, Scots pine)	Apply as an overall spray to dormant stock or as a directed spray if buds have broken.	2.18	1.82
Short Rotation Intensive Poplar	Apply as a directed spray under plants that have been established for 1 year or more	—	1.82

* Only when tank mixed with *MCPA* amine at 0.28 to 0.38 L per acre (600 formulation) or 0.4 to 0.57 L per acre *MCPA K* (400 formulation).

** Use lower rate when weeds do not exceed 2 inches (5 cm) and higher rate for weeds up to 8 inches (20 cm) in height, preferably before they are 5 inches (13 cm) high. Requires the addition of a mineral oil surfactant blend at 1 to 2 L per 100 L or spray solution or spray oil at 1 to 2 L per 10 L of spray solution. See oil labels for directions. DO NOT apply if *linuron* has been applied pre-emergent.

† A split pre-emergent / post emergent application of *linuron* may be made in dill. See below for more information.

Pre-emergent surface (not incorporated) applications for use on loam to clay soils only:

	LINURON 400 (L/acre)		LOROX L (L/acre)	
Soil organic matter	***less than 2%***	***from 2 to 5%***	***less than 2%***	***from 2 to 5%***
Field corn	1.09*	1.58	0.91*	1.31*
Soybeans	1.09 to 1.58	1.58 to 2.18	0.91 to 1.31	1.31 to 1.82
Sweet white lupins	1.01	1.50	0.85	1.25
Potatoes	1.11 to 1.72	1.72 to 2.22	0.91	1.82
Dill†	—	—	0.53 to 0.77	0.77 to 1.0

* Must be tank mixed. Refer to specific labels for registered tankmix partners.

† A split pre-emergent / post emergent application of *linuron* may be made in dill. See below for more information.

If used on sandy soils, severe crop injury may result.
Seed the crop at least 2 inches (5 cm) deep. Make only one application per year to field crops.
When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Split applications:

This product may also be applied to dill as a split pre / post-emergent application. A pre-emergent surface application of up to 0.77 L per acre, followed by a second post-emergent application, no sooner than two weeks after the first, of up to 1.0 L per acre. Minimum staging for post-emergent applications given above still applies.

Banded Applications:

This product may also be applied in a narrow band directly over the row in wide rowed crops if another method is to be used for weed control in between the rows. For band treatment, use proportionately less; for example, for 10 inch band on 30 inch row, use 1/3 of the broadcast rate.

Weeds and Staging:

Post-Emergence

When tank mixed with **MCPA** ***amine in cereals, the following weeds are controlled:***

Chickweed
Corn spurry
Cow cockle
Flixweed
Green foxtail (suppression possible)
Green smartweed
Hemp-nettle
Lady's-thumb
Lamb's-quarters
Ragweed (common, giant)
Redroot pigweed
Shepherd's-purse
Stinkweed
Stork's-bill
Tartary buckwheat
Wild buckwheat

Apply when annual broadleaf weeds are in the 2 to 4 leaf stage and when green foxtail is in the 1 to 3 leaf stage.

In shelterbelts, apply when weeds are less than 4 inches (10 cm) tall.

Pre-emergent surface treatments and Post-emergent applications in corn and shelterbelts:
Sufficient moisture (1 to 2 inches or 3 to 5 cm) in the form of rainfall or irrigation is necessary within 7 to 10 days of a pre-emergence application or poor weed control will result.

Barnyard grass*
Common chickweed
Common groundsel■
Corn spurry■
Crabgrass*
Dandelion (seedlings only)■
Foxtail (green and yellow)*
Goosefoot
Knotweed
Kochia■
Lamb's-quarters
Pigweed (prostrate■, redroot)
Plantain (seedlings only)■
Purslane
Ragweed (common)
Shepherd's-purse
Smartweed (annual)
Sow-thistle (annual, perennial■ seedlings only)
Stinkweed°
Wild buckwheat
Wild radish■
Witchgrass
Wormseed mustard

*partial control
■ Not registered with *Lorox L*.
° Not registered with *Linuron 400*.

Application Information:

Water Volume:
Post-emergent:
Cereals, coriander & caraway: 40 L per acre.
Field Corn directed spray: 69 to 138 L per acre.
Dill: 89 to 178 L per acre
Pre-emergent surface: 81 to 162 L per acre.

Shelterbelts: 90 to 180 L per acre.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) when using conventional stainless steel flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. Use a 50 mesh or coarser line strainers and screens.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

In post-emergent applications the best weed control occurs when temperatures are moderate, when relative humidity is high and when soil moisture is adequate. Injury to cereals (crop lightening) will occur when the crop is under stress because of drought or disease. This injury is worse when the product is applied at advanced leaf stages. In pre-emergent surface treatments, rainfall or irrigation (1 to 2 inches or 3 to 5 cm) is required to move linuron into the root zone of germinating seeds. Insufficient moisture will result in poor weed control. Drought conditions after application will result in little to no weed control. If rainfall does not occur within 7 to 10 days of application and prior to crop emergence, a shallow rotary hoeing (0.75 to 1.5 inches/ 2 to 4 cm) should be made to mix the top layer of soil to help activation. Avoid covering treated ground with un-treated soil. If unusually heavy rain follows application, severe crop injury may result from herbicide in the root zone of the crop. DO NOT use on sandy soils or severe crop injury will result.

Tank Mixes:

Herbicides:
In Cereals: For post-emergent applications in cereals, linuron must be tank mixed with *MCPA* amine or *MCPA K*. DO NOT tank mix with other herbicides.
In Corn: *Atrazine, Dual II Magnum* and *Primextra II Magnum.* Not all linuron products have the same tank mix options, refer to specific labels.

Fertilizers: None registered.

Insecticides: None registered.

Note: The above mixes are those listed on the linuron labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label for post-emergent applications; required interval may be up to 8 hours. Pre-emergent applications require rainfall for activation. Contact manufacturer for more information.

Grazing: DO NOT graze treated crops or cut for feed prior to crop maturity.

Preharvest Interval:

Sweet Corn: DO NOT harvest within 50 days of treatment.
Field Corn: DO NOT harvest within 60 days of treatment or until after tassle emergence.
Caraway, Coriander & Dill: DO NOT harvest within 60 days of treatment.

Re-cropping: If the intended crop fails, fields treated with pre emergent surface applications of linuron, may be seeded back to corn, soybeans, sweet white lupins, or potatoes. Till the soil thoroughly before reseeding. No restrictions 1 year after treatment.

Aerial Application: DO NOT apply by air.

Storage: DO NOT store liquid *Linuron* formulations at temperatures below 5°C. *Lorox L* may be frozen.

Sprayer Cleaning:

Refer to page 15.

Lontrel 360

Herbicide Group
4 - clopyralid
(Refer to page 45)

Company:

Dow AgroSciences (PCP#23545)

Formulation:

360 g/L clopyralid formulated as a solution.

Container size - 3.4 L, 4.45 L, 110 L, 115 L, 208 L, 454 L, Bulk

Crops Rates and Staging:

Applications of 0.17 to 0.23 L per acre:
Barley, spring wheat (NOT including durum), oat - 3 leaf to flag leaf emergence stage.

Applications of 0.23 to 0.34 L per acre:
Flax and Solin (low linolenic acid flax) - 2 to 4 inches (5 to 10 cm) in height.

Applications of 0.17 to 0.34 L per acre:
Canola - 2 to 6 leaf stage. Apply *Lontrel 360* to canola (Argentine - *B. napus* and Polish - *B. rapa*) varieties only; application to any other canola type oilseeds may result in injury to the crop.
Seedling forage grasses* - 2 to 4 leaf stage.
Established grasses* - at the shot blade stage, or in the fall after harvest or in early spring.
Seedling and established grasses* for forage and seed production include:

Bromegrass (smooth)
Fescue (creeping red, meadow, tall)
Kentucky bluegrass
Meadow foxtail
Orchardgrass
Reed canarygrass
Timothy
Wheatgrass (crested, intermediate, slender, streambank, tall**)
Wildrye (Altai, Russian)

Applications of 0.34 L per acre:
Fallow - Stage according to weeds.
Shelterbelts* containing villosa lilac, acute willow, Colorado spruce, white spruce, buffaloberry and chokecherry.*

Plantation poplar (including hybrid poplar)*

* *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this product for these uses do so at their own risk.***

** for forage use only

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

The following weeds will be controlled at 0.17 L per acre when young and actively growing:

Alsike clover
Vetch (*Vicia* sp.)

The following weeds will be controlled from 0.23 to 0.34 L per acre when young and actively growing:

Common groundsel
Common ragweed
Perennial sow-thistle (top growth only)
Scentless chamomile
Wild buckwheat
Volunteer alfalfa -2 to 20 inches (5 to 50 cm) tall

Canada thistle - after all thistles have emerged and when the majority are in the rosette to pre-bud stage:

0.17 L per acre	Provides top growth control of Canada thistle for 6 to 8 weeks.

0.23 L per acre	Provides season long control of Canada thistle. Not all root stalks will be killed and some regrowth may occur by the end of the growing season.
0.34 L per acre	Provides season long control of Canada thistle with suppression into the following year.

Spotted and diffuse knapweed is controlled up to flower emergence at 0.28 L per acre.

Sheep sorel and oxeye daisy is controlled at 0.34 L per acre.

Application Information:

Water Volume: 40 to 89 L per acre.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Poor control may occur under dry conditions. Injury to flax may occur when tank mixing with *MCPA*. To reduce the risk of crop injury, DO NOT apply tank mixes if temperature exceeds 27°C.

Tank Mixes:

Herbicides:

Lontrel applications following applications of products containing bromoxynil (*Approve, Badge, Bromotril, Buctril M, Enforcer, Koril, Logic M, Mextrol, Pardner, Thumper*) should be delayed by 14 days to allow the Canada thistle to recover from leaf burn.

Recommended rates of *Lontrel* may be used for each crop unless otherwise indicated.

In Canola:
Poast Ultra plus *Merge* adjuvant.
Select plus *Amigo* Adjuvant (*Lontrel* at 0.17 to 0.34 L / acre).

In Canola (ROUNDUP READY varieties only):
*Roundup Transorb** (*Lontrel* at 0.112 L / acre).

In Canola (CLEARFIELD varieties only):
*Odyssey*** (*Lontrel* at 0.17 to 0.23 L / acre).

* Roundup Ready varieties only
** CLEARFIELD varieties only

In Flax:
Lontrel at 0.17 L / acre for the following mix:
MCPA amine or ester (0.28 to 0.38 L / acre - 600 g ae/ L formulation)
Poast Ultra plus *Merge* adjuvant.
Poast Ultra + *MCPA* Ester (rates as above)
Select plus *Amigo* adjuvant.

In Spring wheat (NOT including durum) and barley:
Lontrel at 0.11 to 0.17 L/acre for the following mix:
2,4-D or *MCPA* (amine or ester) at label rates.

In Oat:
MCPA amine or ester (*Lontrel* at 0.11 to 0.17 L / acre).

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Lontrel* label only.

Dow AgroSciences also supports the following mixes that are not on the *Lontrel* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Assure II, Muster, Muster+any of Assure II, Clethodim, Poast Ultra, Pursuit,* or *Solo.*

Adding ingredients in the correct order is critical for optimum performance.

Check labels of products to be mixed for directions.

General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry: DO NOT enter treated fields for 12 hours.

Grazing: Crops or areas treated with this product may be grazed immediately following treatment.

Re-cropping: *Lontrel* residues in the soil may affect succeeding crops. The year after application, replant to wheat, barley, oats, rye, flax, forage grasses, mustard or canola.

DO NOT use manure from animals fed or bedded with *Lontrel* treated straw, except on fields that are to be sown to *Lontrel* tolerant crops.

Aerial Application: DO NOT apply by air.

Storage: Store in heated storage. If product is frozen, bring to room temperature and agitate before use.

Buffer Zones: Avoid contamination of or drift toward non target land, water or irrigation ditches.

Sprayer Cleaning:

No cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

Caution - Poison

Danger – Eye Irritant

For an explanation of the symbols used here see page 11.

Manipulator 620

Plant growth regulator

Company:

Taminco US Inc. (PCP#31462)
Distributed by Engage Agro

Formulations:

620 g/L chlormequat chloride formulated as a solution.
Container size – 2 x 10 L.

Crops, Rates and Stages:

Note: Import tolerances (Maximum Residue Limits) for *Manipulator 620* residues in cereal crops have yet to be established by the US-EPA. Cereal crops intended for export to the USA that are treated with *Manipulator 620* may experience difficulty with export approvals to the USA. Producers should check with their commodity buyer before application.

Apply *Manipulator 620* when risk of lodging is high.

CROP*	APPLICATION	RATE (L/ACRE)	STAGE
Spring wheat	Single Application	0.7	1 to 2 node stage
	Split Application	0.3 – First application 0.4 – Second application	2 leaf stage to beginning of stem elongation 1 to 2 node stage
Winter wheat	Single Application	0.7	1 node stage to just before flag leaf emergence
	Split Application	0.4 – First Application 0.3 – Second Application	2 leaf stage 1 node stage to just before flag leaf emergence

* May be applied to crops under-seeded to clover or grasses.

DO NOT apply later than just before flag leaf emergence.

DO NOT exceed 0.7 L of *Manipulator 620* per acre in a single year.

Application Information:

Water Volume: Minimum 40 L per acre

Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. Boom height must be 60 cm or less above the crop.

How it Works:

Manipulator 620 affects the production of plant hormones responsible for cell elongation resulting in plants with shorter, thicker stems.

Effects of Growing Conditions:

DO NOT apply *Manipulator 620* to crops under stress from drought, excess moisture or nutrient deficiency. Best results from early morning or evening application.

Applications of *Manipulator 620* may be made under normal seasonal temperatures down to 1° Celsius. DO NOT apply during frost.

Tank Mixes:

None registered.

DO NOT use in a tank mixture with liquid nitrogen.

Restrictions:

Rainfall: Within 2 hours may reduce effectiveness.

Re-entry: Leave 12 hours before entering treated fields.

Grazing: DO NOT graze treated crops or cut for hay.

Preharvest Interval: DO NOT apply later than just before flag leaf emergence.

Re-cropping: No restrictions the year after application.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Crops	Buffer Zones (metres[†]) Required for the Protection of:
		Terrestrial habitat
Ground	All crops	1

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to page 15.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

MCPA

Herbicide Group
4 - MCPA
(Refer to page 45)

Company and Formulation

	PCP# (Product Name)					
	*Na 300**	*K 400**	*Amine 500**	*Amine 600**	*Ester 500***	*Ester 600***
Agri Star			27858	31322 (Albaugh)	27860	
IPCO	20306	20305	20308	31327		27802
Nufarm	14718			28384		27803
Loveland	9858		9516			27804 (CheckMate)
Farmers of North America/AgriCity			30461		30462	

* Formulated as a solution

** Formulated as an emulsifiable concentrate

Crops, Rates and Staging:

The maximum safe rates for various crops are given below. Higher rates used for harder to control weeds (see "Weeds, Rates and Staging") may cause crop injury. Application rates for individual products may vary from those listed. Refer to the label for product specific use rates. Rates greater than these for harder to control weeds may cause crop injury. When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

CROP	STAGE	MAXIMUM RATE (L/ACRE)			
		AMINE 500	AMINE or ESTER 600	K SALT	Na SALT
Wheat (spring and durum), barley	4 leaf to just before flag leaf emergence.	0.45	0.42 (E)	0.53	0.81
Oats	3 leaf to just before flag leaf emergence.	0.45	0.36	0.53	0.81
Spring rye	4 leaf to just before flag leaf emergence.	0.45	0.42	0.53	0.81
Flax (NOT Solin - low linolenic acid flax)	2 inches (5 cm) in height to prebud stage. Apply at 2 to 4 inches (5 to 10 cm) in height for maximum crop tolerance.	0.4	0.28 (E) or 0.34 (A)	0.65	0.71
Winter wheat (WW), fall rye (FR)	In spring, apply from the time growth commences until the early flag leaf stage.	0.45	0.42	0.61 (WW) 0.40 (FR)	0.81
Corn	As a broadcast spray up to 6 to 7 in. (15 to 18 cm) **tall or 6 leaf stage. Up to 3 weeks before tassling** as a directed spray using drop nozzles.	0.45	0.37 (Amine only)	0.51	0.61
Peas	Vines 4 to 7 inches (10 to 18 cm) long. For short-statured, determinate flowering peas, apply at the early stages within this range.	0.22*	0.17 (Amine only)	NR	0.36*
Cereals underseeded to alfalfa (not Flemish varieties)	Apply when the majority of seedling legumes are in the 1 to 3 trifoliate leaf stage.	0.22	0.19 (Amine only)	NR	0.4
Underseeded alsike, ladino and red clover	Apply when the majority of seedling legumes are in the 1 to 3 trifoliate leaf stage.	0.28	NR	NR	0.4
Red clover◇ Seedling (seed and forage) **Established◇** (seed only)	**Seedlings:** 1 to 3 trifoliate stage. DO NOT feed to livestock in the first year. **Established:** Apply at the breaking of dormancy in the spring up to 7.5 cm.	0.23	0.19 (Amine only)	NR	NR
Grass pastures	Spring or fall.	1.42	1.13 (E) or 1.42 (A)	NR	0.71
Seedling forage** grasses (not for seed)	Apply from the 3 leaf stage to the shot blade stage.	0.45**	NR	NR	NR
Established forage** grasses (not for seed)	Apply in the spring up to the shot blade stage or in the fall after harvest.	0.45**	NR	NR	NR

(E) or (A) indicates *Ester* or *Amine* formulations.

NR = Not Registered

* The rates given are lower than the registered rates for peas. Less than the maximum label rates are recommended because of crop injury concerns.

** *MCPA* is NOT registered for use on forage grasses grown for forage seed.

◇ Nufarm Agriculture *MCPA Amine* only.

†† Use the lowest rate of MCPA Amine 600 on oats between the 3 and 6 leaf stage.

Crops, Rates and Staging *continued*

Formulation Characteristics:

Formulation	Risk of Vapour Drift	Activity on Weeds	Risk of Crop Injury
LV Ester	Medium	Fast	Medium
Amine	Very Low	Medium	Low
Salts	Very Low	Slow	Very Low

Weeds, Rates and Staging:

Apply at lower rates when weeds are small (2 to 4 leaf stage) and actively growing. Higher rates are needed when weeds are larger, in heavy populations, or growing under stressful conditions (excessively cold, hot, dry or wet).

NOTE: The following rates are a general range for all products. Rate ranges for individual products may differ slightly. Consult the product label for specific rates for each application.

+ Not controlled by *MCPA K salt* formulation
++ Not controlled by *MCPA K* or *Na salt* formulations

Susceptible weeds:

Amine 500 formulations – 0.28 to 0.45 L per acre
Amine and Ester 600 formulations – 0.24 to 0.36 L per acre
K formulations – 0.61 to 0.71 L per acre.
Na formulations – 0.5 to 0.81 L per acre.

Burdock
Cocklebur
Flixweed (late fall applications or small seedlings)*
Kochia
Lamb's-quarters
Mustards (except dog and tansy)
Prickly lettuce+
Ragweed
Russian pigweed
Shepherd's-purse*
Stinkweed*
Wild Radish
Wild Sunflower+

* Winter annual weeds

Harder to control weeds:

Amine 500 formulations – 0.45 to 0.71 L per acre.
Ester 600 formulations – 0.42 to 0.61 L per acre.
K formulations – 0.71 to 0.81 L per acre.
Na formulations – 0.81 to 1.1 L per acre.

Annual sow-thistle+
Biennial wormwood+
Bluebur+
Common peppergrass+
Curled dock+
Flixweed (overwintered rosettes prior to bolting)+
Goat's-beard+
Goosefoot+
Hemp-nettle (suppression only)
Mustard (dog and tansy)+
Plantain+
Purslane+
Redroot pigweed+
Smartweed (annual)+
Tumble pigweed+

Top growth control only (rates as for harder to control weeds):

Blue lettuce+
Canada thistle
Corn spurry++
Dandelion++
Gumweed+
Field bindweed+
Field horsetail++
Hedge bindweed+
Hoary cress+
Leafy spurge+
Perennial sow-thistle+
Russian thistle++

Application Information:

Water Volumes:

Cereals, flax, pastures, forage grasses: 40 to 81 L per acre.
Peas: Minimum 61 L per acre.
Cereals Underseeded to Forage Legumes: 61 to 81 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

Tank Mixes:

Herbicides:

In Wheat and barley:
Banvel II (amine and K salt only).
Pardner (IPCO K salt only).
Linuron and *Sencor* (500 amine only).

In Oats:
Pardner (K salt only).
Linuron (500 amine only).

Not all brands are labelled for tank mixing. Check the product label prior to use for registered mixes and rates. Follow all precautions and restrictions on both labels.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: Liquid nitrogen (28-0-0) may be used in place of water as a carrier with certain amine formulations for application in spring to winter wheat or fall rye.

Note: The above mixes are those listed on the *MCPA* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours of *MCPA Na salt* or *MCPA K salt*, 4 hours of *MCPA amine*, or 2 hours of *MCPA ester* application will reduce control.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze within 7 days of application.

Re-cropping: No restrictions the year after application.

Aerial Application: Some products may be applied by air to specific crops. Check the label for detailed instructions.

Storage: *MCPA ester* may be frozen. DO NOT freeze *MCPA amine, MCPA sodium salt* and *MCPA K*.

Buffer Zones:

Crop	Application method	Buffer Zones (metres†) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Cereals, Flax	Ground*	1	1	4
	Fixed wing aircraft	1	0	60
	Helicopter	1	0	50
Legume forages	Ground*	1	1	4
	Fixed wing aircraft	1	1	25
	Helicopter	1	1	25
Pastures	Ground*	1	1	4
	Fixed wing aircraft	15	0	60
	Helicopter	15	0	50

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments **are exempt from buffer zone requirements.**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack applications do not require a buffer.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Best weed control occurs when temperatures are above 21°C (daytime) or 10°C (night time) and humidity is above 70 percent. DO NOT apply if temperature exceeds 27°C. If applying to flax, injury and a delay in maturity may result **from application under hot or humid conditions. Extremely** hard water may reduce performance or cause problems in spraying the product.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. **Based on products with similar chemistry,** 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may **provide adequate cleaning. Contact the manufacturer for** more information.

Hazard Rating:

☠ Warning - Poison

For an explanation of the symbols used here see page 11.

MCPB / MCPA

Herbicide Group
4 - MCPB & MCPA
(Refer to page 45)

Company:

IPCO (*Clovitox Plus* - PCP#24336)
Nufarm Agriculture (*Tropotox Plus* - PCP#8211)
Loveland Products Canada (*Topside* - PCP#22003)

Formulation:

375 g/L MCPB present as a sodium (Na) salt and, 25 g/L MCPA present as potassium (K) salt and formulated as a solution.

Container size - 10 L.

Crops, Rates and Staging:

Registered for all products:
Apply 1.11 to 1.72 L per acre. Apply only that needed to control the target weeds.

DO NOT make more than one application of this or other product containing the same ingredients per year.

CROP	STAGE
Pea	3 to 6 expanded leaves.
Clover (alsike, ladino, red, white Dutch, wild white)	Monofoliate to 3 trifoliate leaf stage (with or without a cover crop).
Oats, wheat, rye or barley (alone or as a companion crop)	2 leaf to flag leaf stage.
Field corn	45 cm high to the start of tassling – use drop nozzles.
Established pasture	After grazing or cutting when weeds have regrown to a susceptible stage.

Seedling Forage Grasses:
Apply at 1.11 to 1.42 L per acre from the 2 to 4 leaf stage:

- Bromegrass (smooth, meadow)
- Fescue (altai, red, meadow, tall)
- Green needlegrass
- Reed canarygrass
- Timothy
- Wheatgrass (crested, creeping intermediate, northern, pubescent, slender, streambank, tall, western)
- Wild rye (altai, Russian)

Registered for *Tropotox Plus*, and *Clovitox Plus* only:
Seedling alfalfa for seed production* at the 3 to 6 trifoliate stage.

NOTE: Seedling alfalfa vigour may be reduced in the year of treatment, however, the crop recovers and yield will not normally be affected.

* *Since this use is registered under the User Requested Minor Use Label Expansion program, the manufacturers assume no responsibility for herbicide performance.* ***Users of this treatment on seedling alfalfa do so at their own risk.***

Weeds, Rates and Staging:

WEEDS	STAGE	RATE (L/ACRE)
Ball mustard, Lamb's-quarters, Stinkweed, Wild mustard, Wormseed mustard	Seedlings	1.11
Annual sow-thistle*, Hemp-nettle*, Redroot pigweed, Ragweed, Shepherd's-purse, Volunteer rapeseed (including canola), Wild radish*	Seedlings	1.72
Curled dock, Perennial sow-thistle**, Plantain	Rosette	1.72

WEEDS	STAGE	RATE (L/ACRE)
Bull thistle	Rosette to early bud	1.72
Buttercup (Creeping, Tall), Field bindweed	In spring during rapid growth	1.72
Canada thistle	6 inches (15 cm) to early bud	1.72
Horsetail*	6 inches (15 cm)	1.72

* Suppression only
** Top growth control only

Application Information:

Water Volume:
Clovitox Plus: 71 to 91 L per acre.
Tropotox Plus, Topside: 61 to 81 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Damage to peas or seedling forage legumes may occur if the crop is sprayed when under drought or disease stress. Under extremely hot or humid conditions, crop injury may be severe. DO NOT apply when temperatures are over 27°C. Best activity on weeds occurs in warm weather.

Tank Mixes:

None registered.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze crop treated with *Topside* or cut for hay. DO NOT graze or cut seedling forage grasses in the year of treatment. Cereals treated with *Tropotox* or *Clovitox* may be used for grazing or cut for greenfeed or hay 30 days after application. Forage legumes and peas treated with *Clovitox* may be used for animal feed 30 days after application. Withdraw meat animals from fields treated with *Tropotox* or *Clovitox* at least 3 days before slaughter.

Re-cropping: No restrictions listed. Phenoxy herbicides can persist in soils for weeks, particularly if dry or cool weather persists. DO NOT seed sensitive crops immediately after spraying.

Aerial Application: *Clovitox* may be applied by air to established pasture and cereal crops (not underseeded to clover).

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

Clovitox Plus:

☠ Danger - Poison

⚠ Danger - Corrosive to eyes

Tropotox Plus & Topside:

☠ Caution - Poison

Tropotox Plus:

⚠ Warning - Contains the allergen caseinate (milk)

For an explanation of the symbols used here see page 11.

Mecoprop-p

Herbicide Group
4 - mecoprop-p
(Refer to page 45)

Company:

Loveland Products Canada (*Mecoprop-P* - PCP#27891)

Formulation:

150 g/L mecoprop-p present as potassium salt. Container size - 10 L.

Crops and Staging:

Spring wheat (including durum), barley and oats - 3 leaf to flag leaf stage.

Weeds and Staging:

Apply to weeds from the 2 to 4 leaf stage.

- Black medic
- Canada thistle (top growth control only)
- Chickweed
- Cleavers
- Clover (volunteer)
- Corn spurry
- Lamb's-quarters
- Plantain
- Wild mustard

Rates:

2.2 to 2.8 L per acre.

Use the high rate for weeds in an advanced stage of growth.

Application Information:

Water Volume: 81 to 121 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Apply in warm weather under good growing conditions. Avoid spraying in very hot weather or in drought conditions.

Tank Mixes:

None registered.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Grazing: DO NOT graze or feed treated crop to livestock prior to crop maturity.

Re-cropping: No restrictions the year after application.

Aerial application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only[*]	1	0	5

See page 36 for an explanation of the different habitats.

[*] Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt from buffer zone requirements.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

Caution - Poison

For an explanation of the symbols used here see page 11.

Metribuzin

Herbicide Group
5 - metribuzin
(Refer to page 45)

Company:

Bayer CropScience (*Sencor Solupak 75 DF, Sencor 75 DF*)
United Phosphorus Inc. (*TriCor 75 DF*)

Formulations:

Sencor Solupak 75 DF **(PCP#20968) :** 75% metribuzin formulated as a dispersible granule. Container size - 2.5 kg (5 water soluble bags, 500 g each).

Sencor 75 DF **(PCP#17242):** 75% metribuzin formulated as a dispersible granule. Container size - 2.5 and 5 kg.

TriCor 75 DF **(PCP#30661):** 75% metribuzin formulated as a dipersable granule. Container size 2.5 kg.

Crops, Rates and Staging:

CROP	APPLICATION TIMING	RATES (g/acre)
Barley	2 to 5 leaf stage.	80 to 152
Spring wheat (including durum)	2 to 5 leaf stage.	80 to 111
Pea (field and processing)*	Preplant incorporated (when tank mixed with *Rival* or *Treflan EC*).	**Spring:** 152 to 192 **Fall:** 190 to 223
Pea (field only)*	Post-emergence - up to 6 inches (15 cm) of vine length. For short-statured, determinate flowering peas, apply at the early stages within this range.	111 to 152
	Split post-emergent applications**.	**First split application:** 60 to 80 **Second split application:** 7 to 10 days later with rates within these ranges.
Lentil*	**Single or split applications**:** Plants up to 6 inches (15 cm) of vine length. For maximum crop tolerance, apply at the 1 to 4 above ground node stage.	111
		First split application: 60 to 80 **Second split application:** 7 to 10 days later with rates within these ranges.
Chickpea*	Up to 2.5 inches (6 cm) in height, when vines have 1 to 3 above ground nodes. *Note: application past recommended growth stage may result in severe crop injury.*	111
Potato (except Belleisle or Tobique)***	Preplant incorporated (with *Eptam*).	152 to 223
	Pre-emergence in sprinkler irrigation systems (apply only in a tank mix with *Eptam 8-E*).	152 to 223

Crops, Rates and Staging continued on next page.

Crops, Rates and Staging *continued*

CROP	APPLICATION TIMING	RATES (g/acre)
Potato (except Atlantic, Belleisle, Eramosa, Tobique and red-skinned or early maturing varieties)***	Early post-emergence (up to 4 inches or 10 cm in height).	151
Soybean***	Preplant incorporated (tank mixed with *Treflan EC*).	111 to 223
Fababean	Preplant incorporated (tank mixed with *Treflan EC*).	**Spring:** 111 to 223 **Fall:** 190 to 223

* DO NOT use on lentils, peas or chickpeas seeded less than 2 inches (5 cm) deep or in soils with less than 4 percent organic matter.

** Under certain field or weather conditions a split application may provide better weed control and crop tolerance than single applications. The first application should be made at the cotyledon to 2 leaf stage of the weeds. The second application should be made when a second flush of weeds have emerged or if weeds which were more advanced at the time of the first application have started to show regrowth. The split applications are normally 7 to 10 days apart.

*** Consult manufacturer or seed supplier for varietal tolerances to *metribuzin* applications in soybean and potato.

Note: When *metribuzin* is tank mixed with *Trifluralin* in peas, fababeans, and soybeans, refer to product label for maximum rates that can be applied on light textured soils.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Post-emergence applications should be made when weeds are small – 2 inches (5 cm) in height or diameter.

Split applications (postemergence on lentils and peas) – 1st application at cotyledon to 2 leaf stage of weeds. 2nd application (if necessary) 7 to 10 days after the first.

Post-emergence at 81 g per acre:
Weeds controlled in spring wheat, barley, field pea and suppressed in lentil and chickpea:

Chickweed
Green smartweed
Hemp-nettle*
Lamb's-quarters
Stinkweed
Volunteer canola
Wild mustard

Additional weeds controlled in spring wheat and barley only:

Lady's-thumb
Redroot pigweed

Post-emergence at 111 g per acre:
Weeds controlled in spring wheat, barley, potato, field pea, and suppressed in lentil and chickpea:
Weeds above plus:

Ball mustard
Corn spurry
Hemp-nettle
Tartary buckwheat

Additional weeds controlled in spring wheat and barley only:

Common groundsel
Night-flowering catchfly
Wormseed mustard

Post-emergence at 152 g per acre in spring wheat and barley only:
Weeds above plus:

Henbit
Russian thistle

Post-emergence at 152 g per acre in potatoes only:
Weeds listed for peas above plus:

Lady's-thumb
Redroot pigweed
Shepherd's-purse

Preplant Incorporated in fababeans, lentils, field pea and soybean:
Must be applied in tank mix with *Treflan EC* or *Rival*):

Chickweed
Corn spurry
Green smartweed
Hemp-nettle
Lamb's-quarters
Stinkweed
Volunteer canola
Wild mustard

Plus weeds controlled by either *Rival* or *Treflan EC*.

* Use the high rate for best control.

** Suppressed only in lentils and chickpeas.

Application Information:

Water Volume:

Preplant incorporated: 40 L per acre.

Post-emergence applications:

Cereals - 40 L per acre.

Lentils, peas, chickpeas - 70 L per acre.

Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. If using conventional flat fan nozzles use a maximum of 30 to 40 psi (200 to 275 kPa) with opening no smaller than 8002 or TK2 with 50 mesh screens. For lentils, peas and chickpeas use nozzles no smaller than 8003 or TK3. Angle nozzles 45° forward to achieve better coverage of vertical weed targets.

Incorporation: All plant growth and stubble should be thoroughly worked into the soil before treatment. Apply directly to the soil surface. Two incorporations are required at right angles for thorough mixing. The first incorporation must be made within 24 hours of spraying. For fall applications, it is preferred that both incorporations be done in the fall. The second incorporation may be delayed until spring to conserve crop residue; however, both incorporations must be done the recommended depth.

Incorporate with a tandem disc, discer or field cultivator (Vibrashank type). Set equipment to work at a depth of 3 to 4 inches (8 to 10 cm). Operate disc implements at 4 to 6 mph (7 to 10 km/hr), cultivators at 6 to 8 mph (10 to 13 km/hr).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions

Crop height reductions or yellowing may occur if high temperatures occur within 48 hours of application. Cold, cloudy weather or frost within 3 days of application will also aggravate injury. If frost occurs, allow 4 to 5 days for crop to recover prior to applying *metribuzin*. Heavy rainfall soon after application to peas, lentils and chickpeas can result in stand reduction on soils with less than 4 percent organic matter.

Tank Mixes:

Herbicides:

In spring wheat or barley:
Dicamba, Target, MCPA amine or *2,4-D amine.*

In potatoes (post emergent) Sencor 75 DF and TriCor only:
*Prism**

In potatoes (preplant incorporated):
Eptam 8-E (Required).

In fababeans (preplant incorporated):
Treflan EC (Required).

In soybeans (preplant incorporated):
Treflan EC (Required).

In peas:
Treflan (PPI)
Rival (PPI).
Sencor 75 DF or TriCor at 77 g/acre plus 0.19 L/acre *MCPA sodium salt* (300 g/L).

* Consult manufacturer or seed supplier for varietal tolerances to *metribuzin* and *Prism* tank-mix applications in potato.

Fertilizers: None registered.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Sencor or TriCor* label only.

Allow 5 days between application of *metribuzin* and application of other pesticides.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours may reduce control.

Re-Entry: DO NOT re-enter treated areas for 12 hours after application.

Grazing: DO NOT graze treated cereal crops within 30 days of application, or peas, chickpeas or lentils within 70 days of application.

Preharvest Interval: DO NOT harvest barley, wheat or potatoes within 60 days of application. DO NOT harvest lentils, chickpeas, or field peas within 70 days of application. DO NOT harvest processing peas or chickpeas within 40 days of application.

Re-cropping: Preplant incorporated treatments may leave a residue in the soil that will affect succeeding crops when using higher rates of product. DO NOT seed canola, sunflowers, onions, celery, peppers, cole crops, lettuce, spinach, red beets, turnips, pumpkin, squash, cucumbers or melons the year after treatment. Fall seeded crops may be injured when seeded the same year as preplant or post-emergence applications of these products.

Aerial Application: No restrictions on label. While aerial application is not specifically prohibited, it is not recommend by the manufacturer

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:			
	Aquatic Habitats of Depths			Terrestrial habitat
	Less than 1 m	1 to 3m	Greater than 3 m	
Ground only*	5	2	1	10

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured is metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Use 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Keep out of reach of children.

Metsulfuron

Herbicide Group

2 - metsulfuron

(Refer to page 45)

Company:

E. I. duPont Canada (*Ally* - PCP#24388)

FMC of Canada (*Accurate* - PCP#29242)

Formulation:

60% metsulfuron methyl formulated as a water dispersible granule.

Container size -

Ally: 122 g package (4 x 30.5 g water soluble bags).

Accurate: 120 g container.

Crops, Rates and Staging:

The following are maximum rates by crop. See the Weeds, Rates and Staging section for weeds controlled by rates less than the maximum.

Cereals - up to 3 g per acre, plus surfactant:

Wheat (spring and durum), barley: 2 leaf up to emergence of the flag leaf.

Established forage grasses for forage or seed production* - up to 3 g per acre, plus surfactant:

Apply from the 2 leaf to flag leaf stage and before canopy is dense enough to prevent thorough leaf coverage.

Crested wheatgrass*
Intermediate wheatgrass*
Creeping red fescue*
Orchardgrass*
Timothy*†

† Fall application with *Ally* only.

* *NOTE - Since applications to forage grasses have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to forage grasses is at the risk of the user.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Cereals and forage grasses:

Unless otherwise indicated, apply to weeds at the 2 to 4 leaf stage.

Alone or in tank mix with a grass control herbicide use 3 g per acre (One 122 g package treats 40 acres). A rate of 2 to 3 g per acre may be used when mixing with certain other herbicides (See **Tank Mixes:**). Add a non-ionic surfactant such as *Agral 90, Ag-Surf II, Companion, Super Spreader* or *Citowett Plus* at 0.2 L per 100 L spray volume.

Weeds Controlled:

Ball mustard
Bluebur
Chickweed
Common groundsel
Corn spurry
Cow cockle
Flixweed
Hemp-nettle
Prostrate pigweed
Redroot pigweed
Scentless chamomile
Shepherd's-purse
Smartweed (green, lady's-thumb)
Stinkweed
Stork's-bill
Tartary buckwheat
Volunteer canola*
Wild mustard

*** CLEARFIELD varieties will be controlled only** with the addition of *2,4-D* or *MCPA*.

Weeds Suppressed:

Canada thistle**
Lamb's-quarters◇
Russian thistle◇
Sow-thistle (annual and **perennial)****
Toadflax
Wild buckwheat***

**** Apply when thistles are less than 6 inches (15 cm) tall.**
***** Apply to wild buckwheat up to the 3 leaf stage.**
◇ Apply when weeds are less than 3 inches (8 cm) tall.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 40 L per acre.

Nozzles and Pressure: No application pressures are recommended by the manufacturer. Typical application pressures for standard flat fan nozzles are from 35 to 40 psi (240 to 275 kPa). **Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressures** designed to deliver proper coverage with ***ASABE medium*** when applying to annual crops and ***ASABE coarse*** droplets **when applying to range and pasture. Use a 50 mesh and** filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Metsulfuron may injure crops stressed by heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in **day/night temperatures, drought, or water-saturated** soils, either before or after application. Weed control will be reduced under dry, cold conditions.

Tank Mixes:

DO NOT mix the soluble bags with any substance containing boron or which releases chlorine.

Herbicides:

In wheat and barley:

2,4-D **Amine or Ester (up to maximum rate for susceptible weeds on 2,4-D page), plus surfactant*.**

MCPA **Amine or Ester** (0.23 to 0.38 L/acre - 600 g/L formulation), plus surfactant.

In creeping red fescue:

Assure II (0.2 to 0.3 L/acre) plus *Sure-Mix* adjuvant*.

Consult tank mix partner labels for additional crop staging and variety restrictions.

*** Use with the 3 g per acre rate of metsulfuron only.**

Insecticides: None registered.

Fungicides: None registered.

Fertilizer: None registered. DO NOT mix the soluble bags with fertilizers.

Note: The above mixes are those listed on the *Metsulfuron* labels only.

E.I. duPont Canada also supports the following mixes that are not on the *Ally* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Puma Advance, Horizon NG*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rain within 4 hours of application of tank mixes with *2,4-D* amine, 2 hours of application of tank mixes with 2,4-D ester, will reduce weed control.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing: No restrictions.

Re-cropping: Refer to table on the opposite page. The following re-cropping intervals, based on soil pH, should be considered as guidelines only. *Metsulfuron* residues may affect crops for a longer period of time than outlined in the following table. Add 12 months to recommendations if less than 5 inches (130 mm) of rainfall in brown and dark brown soils or less than 10 inches (250 mm) rainfall in black or grey wooded soils in any year following application.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Use	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat**
	Less than 1 m	Greater than 1 m	
Cropland	1	1	15
Pasture and Range use	1	1	10

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

** **Terrestrial buffers are not required for transport and utility rights of way**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack applications do not require a buffer.

Caution:

Metsulfuron residues can persist for long periods, potentially limiting re-cropping options. Degradation of *metsulfuron* is dependent on the pH, moisture, and temperature of the soil. Refer to the label for details on rotation and minimum re-cropping intervals.

MINIMUM RE-CROPPING INTERVAL (MONTHS)

SOIL PH	BARLEY, WHEAT	OAT*	CANOLA*	FLAX*	LENTILS	CANARY-SEED	YELLOW MUSTARD
less than 7.0	10	10	10 (22)	10 (22)	34	48	48
7.0-7.9	10	10 (22)	22 (34)	34	48	48	48

*** Figures in brackets refer to re-cropping intervals in brown and dark brown soil zones.**

ALL OTHER DATA **refer to re-cropping intervals in all soil zones. On black and grey wooded soils with pH of 7.5 or less,** fescue may be planted 10 months after application and alfalfa, red clover, peas and flax may be planted 22 months after application. DO NOT use on soils with pH greater than 7.9.

Effects of *metsulfuron* residues on crops other than those listed in the table have not been fully evaluated. Because of the length of re-cropping restrictions and the lack of information on many rotational crops, ***metsulfuron*** is not recommended for use on farms where special crops are grown (such as fababeans, beans, sunflowers, buckwheat, corn, potatoes, sugar beets, etc.).

Sprayer Cleaning:

Metsulfuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to apply *metsulfuron* should be flushed out immediately after *metsulfuron* **is used. Refer to 'Method B' found in the general sprayer** cleaning section on page 15 to 16. All nozzles, screens and filters should be removed and cleaned after applying this product.

Hazard Rating:

Caution - Poison

Caution - **Eye Irritant**

For an explanation of the symbols used here see page 11.

Momentum

Herbicide Group

4 - clopyralid & fluroxypyr
(Refer to page 45)

Company:

Loveland Products Canada (PCP#30456)

Formulation:

90 g/L clopyralid and 90 g/L fluroxypyr formulated as an emulsifiable concentrate.

Container size: 8.99 L.

Crops and Staging:

Apply at the 3 leaf to just before the flag leaf stage of barley, wheat (spring , durum).

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

The following weeds are controlled at the 1 to 4 leaf/whorl stage unless specified:

Canada thistle**
Cleavers
Kochia (2 to 8 leaf)
Stork's-bill (1 to 8 Leaf)*
Volunteer flax (1 to 12 cm)
Wild buckwheat

* Suppression only.

** Season long control, some regrowth may occur in the fall. Apply from the 4 inch (10 cm) to pre-bud stage.

Rates:

0.45 L per acre

Apply a maximum of one application of this product or other products containing either clopyralid or fluroxypyr.

Application Information:

Water Volume: 40 L per acre.
Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool (less than 8°C) temperatures, weeds are not actively growing and control may be reduced. DO NOT apply to weeds stressed longer than 20 days from lack of moisture as poor control can result.

Tank Mixes:

Herbicides:
MCPA Ester 500 (0.34 to 0.45 L/acre)
MCPA Ester 600 (0.28 to 0.38 L/acre)
Momentum **alone or tank mixed with MCPA ester rates above may be mixed with the following:**

In spring wheat (including durum) and barley:
Tralkoxydim (0.20 L/acre) plus registered adjuvant
Imazamethabenz (0.52 to 0.64 L/acre) plus water pH adjuster
Fenoxaprop 120 EC (0.16 to 0.31 L/acre).

In spring wheat (including durum):
Clodinafop (label rates)
Simplicity (0.2 L/acre)
Traxos (label rate)

† Note: The manufacturer may not support all brand of these products. See the label or contact Loveland Products Canada for more information.

Check the labels of mix partners for additional crop staging restrictions.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Momentum* label only.

Loveland Products Canada also supports the following mixes that are not on the *Momentum* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Everest 2.0, Puma Advance, Varro, Avert, Refine SG* and *2,4 D Ester*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; **required interval between application and rain without loss** of control may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated fields or cut for hay within 3 days of application.

Preharvest Interval: Leave 60 **days between application and** harvest.

Re-cropping: Wheat, barley, oats, rye, flax, canola, mustard and peas may be planted the year after application or the field may be fallowed. DO NOT under-seed crops to forage legumes the year after treatment. DO NOT sow ***any other*** crops until the second year after application. Apply manure bedded with straw from treated crops only to the crops listed above.

DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field peas an additional 12 months (22 months following application). Contact your local Loveland Products Canada representative or retailer for more information before seeding field peas following drought conditions in the previous year.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	15	15	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments are exempt **from buffer zone requirements.**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

No specific cleaning recommendaitons are provided on the Momentum label. As a petroleum based emulsifiable concentrate, 'Method B' in the general section on sprayer cleaning on page 15 to 16 may be the most effective. Check with the manufacturer for more information.

Hazard Rating:

⚠ Warning – Eye Irritant

For an explanation of the symbols used here see page 11.

Muster Toss-N-Go

Herbicide Group
2 - ethametsulfuron
(Refer to page 45)

Company:

E. I. duPont Canada (PCP# 23569)

Formulation:

75% ethametsulfuron-methyl formulated as a water dispersible granule.

Container size - 320 g (4 x 80 g water soluble bags).

Crops , Rates and Staging:

NOTE: NOT for use on Yellow mustard (Brassica alba).

CROP	RATE (g/acre)	STAGE
Canola	8 to 12	Minimum 2 leaf stage (main stem) to the start of bolting.*
Mustards: Brown & Oriental condiment as well as oilseed quality (*Brassica juncea*)	8	4 leaf stage but prior to bolting.
Ethiopian Mustard *(Brassica carinata)*		
Sunflower	8 to 12	2 to 8 leaf stage (15 to 45 cm)

* NOTE: DO NOT apply prior to this stage as severe crop injury can occur.

Muster applied alone requires the addition of _Agral 90_, _Agsurf II_, or _Citowett_ at 0.2 L per 100 L of spray solution.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Weeds, Rates and Staging:

Apply from the 2 to 6 leaf stage. Stinkweed must be sprayed in the 1 to 4 leaf stage

At the 8 g per acre rate (one 320 g package treats 40 acres):

Flixweed *
Green smartweed
Hemp-nettle
Stinkweed **
Wild mustard

The 12 g per acre rate (one 320 g package treats 26.7 acres) controls above weeds plus:

Redroot pigweed **
Stinkweed

* Spring seedlings only.

** Suppression with *Muster* alone but control with *Assure II* plus *Sure Mix* or a *Poast Ultra* plus *Merge* tank mix where permitted.

Muster applied alone requires the addition of _Agral 90_, _Agsurf II_, or _Citowett_ at 0.2 L per 100 L of spray solution. Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 L per acre.

Equipment, Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) **when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure** designed to deliver thorough, even coverage of ***ASABE medium*** **droplets. Use a 50 mesh or coarser screen and filter system. Sprayer must be equipped with continuous agitation.** Maintain the spray boom at 24 inches or less above the crop canopy.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT use on crops that are stressed because of drought or flooding. Less than acceptable control will occur in fields where high weed populations exist and where stressful environmental conditions prevail (drought, cold weather). Heavy rainfall soon after application may result in visual crop injury or possible yield reduction. Thin crop stands or application prior to the 2 leaf stage, sandy soils or soils with low organic matter may increase the severity of the injury.

Tank Mixes:

DO NOT mix with substances that contain boron or that release chlorine.

Herbicides:

Canola, Brown and Oriental Mustards (Brassica juncea only): Assure II. The adjuvant used with *Assure II* is all that is required for this tank mix.

Canola only:

Poast Ultra. The adjuvant used with this product is all that is required for this tank mix.

NOTE: **No tank mixes are registered for** *Brassica carinata.*

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered. DO NOT mix soluble bags with liquid fertilizers.

Note: The above mixes are those listed on the *Muster* label only.

E.I. duPont also supports the following mixes that are not on the Muster label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: *Assure II* plus *Lontrel, Lontrel, Lontrel plus Poast.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 4 to 6 hours may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze or feed crop to livestock within 60 days of application. DO NOT graze treated sunflowers.

Preharvest: Leave 60 days from application to harvest.

Re-cropping: DO NOT sow wheat, barley, oats or flax within 10 months of application. DO NOT seed canola, lentils, peas, fababeans, tame mustard, alfalfa, canaryseed, dry beans, fescues or red clover within 22 months of application. **All other crops must not be sown until a "field bioassay" is performed at 22 months (or more) after application.** Growers may experience reduced yields if other crops (such as corn) are grown without following these guidelines.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones:

CROP (By ground only*)	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Canola, Sunflower, *Brassica carinata*	4	2	55
Mustard (Condiment and Oilseed types)	3	2	40

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Sprayers used to apply *Muster* should be flushed out immediately after *Muster* is used. Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

None indicated.

Odyssey

Herbicide Group

2 - imazamox & imazethapyr
(Refer to page 45)

Company:

BASF Canada (PCP#25111)

Formulation:

35% imazamox and 35% imazethapyr formulated as a dispersible granule.

Container size - 8 x 86.5 g water soluble packs per 40 acre case.

Crops and Staging:

CROP	LEAF STAGE
Field pea; Fababean	1 to 6 nodes/true leaf stage
Clearfield canola; Clearfield oilseed mustard (*Brassica juncea*)	2 to 6 leaf
Clearfield lentil	1 to 9 above ground nodes
Soybean	1 to 3
Fenugreek (seed or forage); Alfalfa*†; Bird's-foot trefoil*†	1 to 4

* Seed production only.
† Seedling and established.

Temporary crop yellowing may be observed shortly after application in field pea, fababean, and CLEARFIELD canola.

Weeds, Rates and Staging:

Merge adjuvant (sold separately) must be used at a rate of 0.5 L per 100 L of spray solution.

At 17.3 g per acre (40 acres per case), Odyssey will control:
Grasses - 1 to 4 main stem leaves, until tillers are visible:

Barnyard grass
Green foxtail
Persian darnel
Volunteer cereals (wheat excluding CLEARFIELD varieties, barley, oats)
Wild oat

Broadleaf Weeds - cotyledon to 4 leaf stage unless otherwise indicated:

Chickweed
Cleavers (up to 4 whorls)
Flixweed
Green smartweed
Hemp-nettle*
Lamb's-quarters***
Redroot pigweed
Russian thistle†
Shepherd's-purse
Stinkweed
Stork's-bill
Volunteer canola (not CLEARFIELD varieties)
Volunteer tame mustard (not CLEARFIELD oilseed (*B. juncea*) varieties)
Wild buckwheat*
Wild mustard

* Suppression only in field peas and CLEARFIELD lentils.
** Suppression only in field peas and CLEARFIELD canola, not controlled in CLEARFIELD lentils.
*** Suppression only.
† Supression only in CLEARFIELD lentils.

DO NOT apply *Odyssey* more than once or follow *Odyssey* with any product containing imazamox or imazethapyr in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. Use 50 mesh or coarser filter screens.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

Herbicides:

In CLEARFIELD canola only:
Lontrel 360 (0.17 to 0.23 L / acre).

In field peas, CLEARFIELD canola, CLEARFIELD lentils, and soybeans only:
Poast Ultra (190 mL / acre).

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Odyssey* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall within 3 hours of application may reduce control.

Re-Entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze treated canola or soybean or cut for hay. Field pea may be fed to livestock 30 days after application. DO NOT harvest forage or cut for hay.

Preharvest Interval: DO NOT apply within 60 days of harvesting canola, fababean, oilseed *Brassica juncea*, field pea, and lentil. DO NOT apply within 85 days of harvesting soybean.

Re-cropping: Field pea, lentil, CLEARFIELD canola, canaryseed, oat, barley, field corn, chickpea and spring wheat (including durum) may be seeded the first full season after application. Flax, canola and sunflower may be seeded the second full season after application. The company recommends that a field bio-assay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above.

NOTE: Breakdown of Odyssey *may be slowed or delayed by environmental conditions such as drought, excessive cold and/or acid soils (pH less than 6.5) resulting in an increased risk of injury to rotational crops. The most tolerant crops are CLEARFIELD canola and legume crops, then cereals. Contact manufacturer for additional information on re-cropping interval (1-877-371-2273).*

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Store in a cool, dry place above 5°C.

Buffer Zones: Avoid spraying in situations where drift may occur. Leave a buffer zone of at least 11 m between the outside boundary of the sprayed area and sensitive areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs.

Sprayer Cleaning:

Refer to 'Method C' in the general sprayer cleaning section on page 15 to 16.

Hazard Rating:

⚠ Warning – Eye and Skin Irritant

⚠ Warning – Contains allergen "sulfites"

For an explanation of the symbols used here see page 11.

Odyssey Ultra

Herbicide Group

1 - sethoxydim
2 – imazamox, imazethapyr
(Refer to page 45)

This product is a prepackaged tank mix of *Odyssey* (page 254) and *Poast Ultra* (page 268). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above

Company:

BASF Canada

Formulation:

The *Odyssey Ultra* package contains the following components:

***Odyssey Ultra A* (PCP#31353):** 35% imazamox and 35% imazethapyr formulated as a dispersible granule.
Container size - 8 x 86.5 g water soluble packs.

***Odyssey Ultra B* (PCP#31354):** 450 g / L sethoxydim formulated as an emulsifiable concentrate.
Container size – 1 x 6.1 L jug.

***Merge* adjuvant (PCP#24702):**
Container size – 1 x 8.1 L

Crops and Staging:

CROP	LEAF STAGE	DAYS TO HARVEST
Field pea	1 to 6*	60
CLEARFIELD canola	2 to 6	60
CLEARFIELD lentil	1 to 9*	60
Soybean	1 to 3	85

* Above-ground nodes

Weeds, Rates and Staging:

At 17.4 g per acre *Odyssey Ultra A* and 0.15 L per acre *Odyssey Ultra B* (one package treats 40 acres): Weeds controlled by *Odyssey* (*Odyssey Ultra A*) plus the grasses controlled by *Poast Ultra* (*Odyssey Ultra B*) plus the weeds below:

Japanese brome†*
Quackgrass (Suppression - 2 to 5 leaf)

† Spring seedlings only.

* Supression of fall emerged Japanese brome with Odyssey Ultra alone but control with Poast Ultra (0.04 L/acre) tank mix.

Odyssey Ultra requires the addition of *Merge* adjuvant at 0.5 L per 100 L of spray solution.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:
Poast Ultra (0.04 L/acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Optica Trio

Herbicide Group

4 - MCPA, mecoprop & dichlorprop
(Refer to page 45)

Company:

Loveland Products Canada (PCP#29662)

Formulation:

160 g/L MCPA + 130 g/L mecoprop-p + 310 g/L dichlorprop-p formulated as a solution

Container size - 10 L.

Crops and Staging:

CROP	STAGE
Barley, oat, spring wheat (including durum)	2 to 5 leaf
Winter wheat	Spring application only: up to 12 inches (30 cm) high (top leaf extended)

Weeds, Rates and Staging:

Weeds controlled at the 2 to 3 leaf stage unless otherwise indicated.

Apply at 0.61 L per acre to control:

Lamb's-quarters
Stinkweed
Volunteer canola
Wild mustard

Apply at 1.0 L per acre to control the weeds listed above plus:

Canada thistle*
Chickweed (Common)
Cleavers (1 to 2 whorls)
Kochia
Lady's-thumb (suppression)
Ragweed (Common)
Redroot pigweed
Wild buckwheat

* Top Growth Control only.

DO NOT apply Optica Trio more than once or follow application with any related product in the same year.

Application Information:

Water Volume: Minimum 20 L per acre.

Nozzles and Pressure: 30 to 43 psi (200 to 300 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Less than satisfactory control may result if weeds are not actively growing such as under conditions that are extremes of hot or cold, dry or wet weather prior to spraying.

Tank Mixes:

Herbicides:

Spring wheat (including durum):

Signal (93 mL/acre) plus supplied adjuvant.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Optica Trio* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT feed treated crops to milking animals or harvest for forage within 7 days of application. Meat animals grazing treated crops must be removed 3 day prior to slaughter.

Preharvest: No pre-harvest interval indicated on label when *Optica Trio* is used alone.

Re-cropping: No information provided on label. Contact manufacturer for information.

Aerial Application: DO NOT apply by air.

Storage: Keep from freezing.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	2

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

Caution - Poison

Danger - Corrosive to eyes

For an explanation of the symbols used here see page 11.

Option 35 DF/Option 2.25 OD

For use in Manitoba only.

Herbicide Group
2 - foramsulfuron
(Refer to page 45)

Company:

Bayer CropScience

Formulations:

Option 35 DF **(PCP#27425):** 35% foramsulfuron formulated as a dispersible granule.
Container size - 8 x 100 g packets per case.

Option 2.25 OD **(PCP#27424):** 22.5 g/L foramsulfuron formulated as an oil dispersion.
Container size - 6.3 L jug.

Crops and Staging:

Field corn at the 1 to 8 leaf stage or 5 to 6 visible collars

Weeds and Staging:

Annual Grasses:

WEED	LEAF STAGE
Barnyard grass	1 to 6 (to early tillering)
Foxtail (green and yellow)	2 to 5 (to early tillering)
Proso millet	2 to 5 (to early tillering)
Witchgrass	2 to 4

Broadleaf Weeds:

WEED	LEAF STAGE
Chickweed, common	4 to 6
Lamb's-quarters	4 to 8
Mustard, wild	5 to 7
Mustard, wormseed	5 to 9
Nightshade, eastern black	1 to 5
Pigweed, redroot	1 to 7
Ragweed, common*	2 to 4

* Suppression only.

Rates:

Option 2.25 OD: 0.63 L per acre (10 acres per jug) plus 28% UAN (liquid 28-0-0) at 1.0 L per acre.

Option 35 DF: 40.5 g per acre (20 acres per case) plus 28% UAN (liquid 28-0-0) at 1.0 L per acre plus *Hasten* Adjuvant at 0.71 L per acre.

NOTE: Option 35 DF and *Option 2.25 OD* must be tank mixed with ***Banvel II*** at 121 mL per acre.

Add *Option 35 DF* or *Option 2.25 OD* to a half full tank, followed by *Banvel II*, then 28% UAN then *Hasten* adjuvant (for use with *Option 35 DF* only).

Application Information:

Water Volume:
Option 35 DF: 89 L per acre.
Option 2.25 OD: 60 L per acre

Nozzles and Pressure: Use 25 to 40 psi (175 to 275 kPa) when using conventional 80° or 110° flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use with 50 mesh or larger screens.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Under optimum conditions weed growth ceases within 1 to 3 days and yellowing of the growing point occurs in 5 to 10 days. Warm moist conditions provide for the best activity. Activity may be reduced or delayed if applied under cool and/or dry conditions or in the presence of heavy dew, fog, mist or rain or if weeds are dust covered. If the crop or weeds are under stress due to environmental conditions, delay application until the both crop and weeds have resumed active growth.

Tank Mixes:

Herbicides:
Banvel II (121 mL/acre)*

Insecticides: Avoid application to corn that has been treated with organophosphorous insecticides.

Fungicides: None registered.

Fertilizers: DO NOT use any fertilizers or additives other than 28% UAN (1 L/acre), recommended*.

* *Option 35 DF* must be applied to corn in Manitoba as a tank-mixture with *Banvel II*, 28% UAN and *Hasten* adjuvant. *Option 2.25OD* must be applied to corn in Manitoba as a tank-mixture with *Banvel II* and 28% UAN. See 'Rates' section above.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours may reduce control.

Re-entry: DO NOT enter treated fields until residues have dried.

Grazing: DO NOT graze treated corn crops or cut for forage within 45 days of application.

Preharvest Interval: Leave 70 days between application and harvest of grain.

Re-cropping: The following crops may be grown the season following application: alfalfa, barley, bean (dry common), canola, clover (red), corn (field and sweet), oat, pea, potato, soybean, timothy, spring wheat. Winter wheat may be seeded 4 months after application.

Aerial Application: DO NOT apply by air.

Storage: Keep dry.

Buffer Zones:

Application method (ground only*)	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Option 35 DF	1	1	3
Option 2.25 OD	1	1	3

See page 36 for an explanation of the different habitats.

* **Buffer zones for ground applications can be reduced by** 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Option residues in the spray tank can cause severe injury to sensitive crops at very low concentrations. Sprayers should be cleaned out immediately before using another product. Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Option 35 DF:

◇ **Warning – Skin and Eye Irritant.**
Potential Skin Sensitizer

Option 2.25 OD:

▽ Caution - **Eye Irritant**

◇ Warning - Skin Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Outlook

Herbicide Group
15 - dimethanamid
(Refer to page 45)

Company:

BASF Canada (PCP#29194)

Formulations:

720 g/L dimethanamid-P formulated as an emulsifiable concentrate.
Container size – 2 x 9 L.

Crops and Staging:

Potatoes - After seeding or hilling prior to emergence of the crop. DO NOT apply before seeding or hilling.

Weeds and Staging:

Prior to the emergence of foxtail (green and yellow), barnyard grass, crabgrass (large, smooth), redroot pigweed, eastern black nightshade*.

* Control with highest rate (390 mL/acre) only. Lower rates provide suppression only

Rates:

Apply at 306 to 390 mL per acre. Apply at the higher rate on fine-textured or high organic soils and for heavier anticipated weed problems. DO NOT exceed the equivalent of a single application of *Outlook* or *Frontier Max* in a single season.

Pre-emergence surface treatments:

SOIL TYPE (Texture)	RATE (mL PER ACRE)		
	Less than 3% Organic Matter	**3 to 6% Organic Matter**	**7 to 10% Organic Matter**
Coarse	**306**	**306**	**348**
Medium and Fine	**306**	**348**	**390**

Application Information:

Water Volume: A minimum of 40 L per acre.

Pressure: 30 to 43 psi (200 to 300 kPa).

Nozzles: Flat fan or flood-jet. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use 16 mesh suction screen, 50 mesh elsewhere on sprayer.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Rainfall is required within 7 to 10 days of application to activate and move *Outlook* into the soil zone. If dry conditions persist, a shallow cultivation or the use of a rotary hoe is necessary to move the herbicide into moist soil and control weed escapes. Shallow tillage is important to minimize dilution of the herbicide. If drought conditions persist after pre-emergence applications, weed control may not be adequate

Restrictions:

Rainfall: Avoid heavy rainfall after application. A light to moderate rainfall 7 to 10 days after application is important for good weed control.

Re-entry: DO NOT enter treated fields for 24 hours.

Preharvest Interval: Leave 40 days between application and harvest.

Grazing: DO NOT graze within 40 days of application.

Re-cropping: In the event of a crop failure, treated fields may be seeded back to corn (field or sweet), soybeans, or dry common beans. DO NOT reseed potatoes after a crop failure. Cereal crops may be planted 100 days after application. The crops above plus green onions, potato and transplanted cabbage may be planted the next season after use. All other crops may be seeded 11 months after application.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Must be stored under heated warehouse conditions.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only[*]	1	1	3

See page 36 for an explanation of the different habitats.

[*] **Buffer zones for ground applications can be reduced by** 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Overdrive

Herbicide Group

4 - dicamba
19 - diflufenzopyr
(Refer to page 45)

Company:

BASF Canada (PCP#30065).

Formulation:

20% diflufenzopyr and 50% dicamba sodium salts formulated as water dispursible granules.

Container size 4 x 3.4 kg.

Crops and Staging:

Established permanent grass pasture, non-cropland sites and rangeland. DO NOT apply *Overdrive* on annual crops or newly seeded grasses.

Weeds and Staging:

Biennial wormwood
Canada thistle*
Dandelion**
Kochia (up to 15 cm)***
Lady's-thumb
Lamb's-quarters
Leafy spurge**
Perennial sow-thistle (2 to 10 leaf)
Ragweed (common)
Redroot pigweed
Sweet clover*
Tall waterhemp
Velvetleaf
Vetch*
Volunteer canola (up to 4 leaf)
Wild buckwheat

* Top growth control
** Top growth suppression
*** Including Group 2 and 9 resistant biotypes.

Rates:

115 g per acre. (One package treats 118 acres)

Merge Adjuvant at the rate of 0.25 L per 100 L of spray solution or a nonionic surfactant at 0.25 L per 100L of spray solution plus ammonium nitrate (UAN 28%) at 1.25L per 100L of spray solution must also be added. Use of an anti-foam agent is suggested.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 89 L per acre. Use higher water volumes when treating dense or tall vegetation.

Nozzles and Pressure: Maximum 20 psi (150 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of application equipment and pressure that is designed to deliver an even coverage of ***ASABE coarse*** droplets that are less prone to drift. Non-target broadleaf plants are very sensitive to *Overdrive* drift. Avoid conditions that are conducive to drift. (See page 12 for drift control suggestions).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT spray if temperatures are expected to exceed 27°C. DO NOT spray in high humidity or fog. DO NOT spray if wind velocity exceeds 8 km/h. Established grasses growing under stress conditions can exhibit various injury symptoms that may be more pronounced if herbicides are applied.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Heavy rain within 4 hours of application may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT permit lactating dairy animals to graze fields within 7 days after application. DO NOT harvest forage or cut hay within 30 days after application. Withdraw meat animals from treated fields at least 3 days before slaughter.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place.

Buffer Zones:

Hand-held or backpack sprayer and spot treatment DO NOT require a buffer zone from sensitive habitat, but efforts should be made to minimize exposure to sensitive plants and open water or wetlands.

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Freshwater habitat	Terrestrial habitat
Field sprayer*	15	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution - Poison

▽ Caution - **Eye Irritant**
Potential Skin Sensitizer

◇ Warning - Contains the allergen sulfites

For an explanation of the symbols used here see page 11.

Paradigm

Herbicide Group
2- florasulam
4 - halauxifen
(Refer to page 45)

Company:

Dow AgroSciences (PCP#31304)

Formulation:

20% halauxifen present as methyl ester and 20% florasulam formulated as a water dispersible granule.

Container size - 4 x 1.6 kg jugs per case.

Crops and Staging:

Spring wheat (including durum) and barley:
2 leaf stage to just prior to emergence of the flag leaf.

Winter wheat: 3 leaf stage to just prior to emergence of the flag leaf.

Weeds and Staging:

Apply to actively growing weeds at the 1 to 8 leaf stage unless otherwise specified:

Weeds Controlled:

Buckwheat, wild
Chickweed
Cleavers (1 to 9 whorl stage)
Dandelion (rosettes up to 30 cm in diameter)
Fleabane, Canada (up to 15 cm)
Flixweed
Lamb's-quarters
Mustard, wild†
Ragweed, common (up to 6 leaf)
Redroot pigweed
Round-leaved mallow (up to 6 leaf)
Shepherd's-purse†† (up to 20 cm)
Smartweed (green, lady's-thumb)
Sow-thistle, annual (up to 4 leaf)
Stinkweed†
Stork's-bill
Volunteer alfalfa (up to 25 cm)
Volunteer canola (NOT Clearfield varieties)
Volunteer flax (up to 15 cm)

Weeds Suppressed:

Canada thistle (up to 30 cm)
Hemp-nettle
Kochia* (up to 15 cm)
Sow-thistle, perennial††

* **Light to moderate infestation (up to 150 plants/m2).**
† **Best results prior to the 4 leaf (seedling) stage.**

Rates:

Paradigm: 10 grams per acre (one 1.6 kg jug treats 160 acres).

***Turbocharge* or *Intake* adjuvant:** 0.5 L per 100 L of spray solution. Surfactant purchased separately.

Application Information:

Water Volume: Minimum 40 to 55 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.

Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction **nozzles may require higher pressures for proper perfor**mance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Weeds and crops must be actively growing. Extreme growing conditions such as drought or near freezing temperature prior to, at or following time of application may reduce weed control.

Tank Mixes:

* *Turbocharge* or *Intake* **not required with tagged tank mixes.**
** **Add** *Agsurf* **or** *Agral 90* **surfactants at 0.25 L per 100 L of** spray solution.

Herbicides:
MCPA 600 Ester (232 mL/acre)*
Curtail M (0.6 L/acre)*
Everest 2.0 (14.5 to 29 mL/acre)**
Everest 2.0 + MCPA (rates above)**
Everest 2.0 + *Curtail M* (rates above)**
Simplicity (0.2 L/acre)**
Simplicity + MCPA (rates above)**
Simplicity + *Curtail M* (rates above)**

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Paradigm* label only. Dow also supports the following mixes that are not on the Paradigm label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Simplicity GoDRI*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry Interval: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze livestock within 7 days of application. DO NOT cut for silage or hay within 21 days of application.

Pre-harvest Interval: DO NOT harvest crops within 60 days of application.

Re-cropping Interval: Barley, canola, flax, field peas, mustard (oriental, brown and yellow condiment as well as **oilseed quality** (*B. juncea*) varieties), soybeans, sunflower, and spring wheat may be seeded the spring following **application. Lentils may be grown the second season after** application.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place in original container.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only	1	1	1

See page 36 for an explanation of the different habitats.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning **on page 15 to 16. Check the cleanout requirements of** pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

▽ Caution - Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Permit

Herbicide Group

2- Halosulfuron

(Refer to page 45)

Company:

Gowan Canada (PCP#31210)

Formulation:

72.6 % halosulfuron methyl ester formulated as water dispersible granules

Container size: 567 g.

Crops and Staging:

Pre-emergent surface[†]:

Dry beans*: Apply 14.2 **to 19 g/acre after seeding but prior** to soil cracking.

-or-

Apply up to 28.3 g per acre to soil between crop rows with a hooded sprayer. Avoid contacting planted crop or injury may result. Maximum of one application per year.

Post-emergent foliar[†]:

Dry beans*: Apply 14.2 to 28.3 g per acre at the 2 to 4 trifoliate leaves, prior to flowering. Maximum of one application per year.

Corn (sweet, popcorn): Apply 19 to 28.3 g per acre up to the 10-12 leaf stage. A second application of 19 g per acre may be applied with drop nozzles if needed, avoiding contact with the whorl. Maximum of two applications per year.

Corn (Field): Apply 19 to 37.6 g per acre up to the 10-12 leaf stage. A second application of up to 37.6 g per acre may be applied with drop nozzles if needed. Maximum of two applications per year.

Proso (Crown) millet: Apply 14 to 19 g per acre from the 2 leaf up to prior to head emergence. Maximum one application per year.

** Note: not all varieties have been tested for tolerance. For untested varieties apply to a small area to determine tolerance prior to use on a large scale.*

[†] **Applications to emerged weeds require the addition of a** non-ionic surfactant with 80% or greater active ingredient content at the lowest labelled rate for the surfactant regardless of crop stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Weeds controlled with pre-emergent soil applications of 14 to 19 g per acre unless otherwise indicated:

Annual sunflower
Canada fleabane
Chickweed (common)
Cocklebur
Common groundsel
Corn spurry
Creeping yellowcress
Flower-of-an-hour
Fringed (Northern) willowherb
Hairy galinsoga
Jimsonweed
Lamb's-quarters
Plantain, broadleaf
Pigweed (redroot, smooth)
Prickly lettuce
Purslane*
Ragweed (common)
Round-leaved mallow
Shepherd's-purse
Smartweed (Lady's-thumb, Pennsylvania)
Spiny amaranth
Stinking Mayweed
Wild mustard
Wild radish
Velvetleaf
Yellow nutsedge[A]

[A] Requires a rate of 28.3 to 37.6 g per acre rate for suppression based on the maximum rate for each crop.

* Suppression only

Weeds controlled from the 3 leaf stage (unless otherwise indicated) to the maximum leaf stage indicated:

WEED	Maximum Weed Height (cm)	
	14 to 19 g/acre	28.3 to 37.6 g/acre
Annual sunflower	31	38
Bindweed (Hedge)*	5	10
Cocklebur	23	36
Common milkweed*	13	31
Corn spurry	5	10
Creeping yellowcress	5	10
Fleabane (Philadelphia)	8	8
Flower-of-an-hour	8	31
Hairy galinsoga	5	10
Horsetail*	5	10
Pigweed (redroot, smooth)	8	15
Ragweed (common)	23	31
Ragweed (giant)	8	15
Shepherd's-purse	5	10
Smartweed (Lady's-thumb, Pennsylvania)	5	10
Spiny amaranth	8	15
Wild mustard	8	15
Wild radish	8	15
Velvetleaf	23	31
Yellow nutsedge	8 to 15	8 to 31

* Suppression only.

Application Information:

Water Volume: Minimum 40 to 55 L per acre. Use the higher volume when there is a heavy crop canopy or weeds are at an advanced stage.

Nozzles and Pressure: Use 40 psi (275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE medium*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Moisture is necessary to activate the herbicide in soil for effective weed control. Dry weather following applications may reduce effectiveness. Extremes in environmental conditions such as temperature, moisture, soil conditions, and cultural practices may affect activity.

Optimum activity is experienced between 12 to 24 °C when weeds are actively growing. Weeds may not be actively growing and as a result reduced activity will occur when temperatures are below 8 °C or above 27 °C.

Tank Mixes:

Herbicides:

In dry beans:

Eptam 8E (1.72 to 2.12 L/acre) at the pre-emergence stage only. Requires incorporation – see *Eptam* page.

In field corn only:

2,4-D (label rates)
Accent (label rates)
Aatrex (label rates)
Dicamba (label rates)
Glyphosate in glyphosate tolerant corn only (label rates)

Insecticides: None registered. *NOTE: The application of foliar organophosphate insecticides to treated crops can increase the risk of crop injury.*

Fungicides: None registered.

Fertilizers: UAN or high grade ammonium sulfate (21-0-0) may be used if a tank mix partner requires it as an additive. Do not use liquid fertilizer as a spray carrier.

Note: The above mixes are those listed on the Permit label only. Gowan Canada supports the use of the following mixes that are not on the label:

Dry Bean - glyphosate prior to ground crack.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Activity of foliar applications may be reduced if rainfall or irrigation occurs within 4 hours. Pre emergent surface applications will benefit from some rainfall but excessive rainfall (greater than 1 inch or 2.5 cm) shortly after application may result in injury, especially when seeding is shallow.

Re-Entry Interval: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or cut corn for livestock greenfeed within 30 days of the last application. Allow 30 days for sweet corn and 65 days for popcorn or grain corn from the last application to foliage and the harvesting of silage. Proso (crown) millet may be grazed immediately after treatment. DO NOT cut proso (crown) millet for hay within 37 days of application or feed straw within 50 days of application.

Pre-harvest Interval: DO NOT harvest dry beans within 30 days of post-emergent applications. DO NOT harvest proso (crown) millet within 50 days of application. There is no pre harvest interval indicated for grain corn.

Re-cropping Interval: Delay seeding the following crops for the interval indicated:

- Dry common beans – no delay required
- Field corn - 1 month;
- cereals (wheat barley and oats) - 2 months;
- potatoes, peas forage legumes and soybeans - 1 year;
- canola and sunflowers - 2 years.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place in original container.

Buffer Zones:

Crop	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Proso (Crown) millet	10	4	15
Dry beans	10	5	20
Corn (sweet, pop)	15	5	30
Corn (field)	15	10	40

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution – Poison

▽ **Caution – Eye Irritant**

For an explanation of the symbols used here see page 11.

Pinnacle SG

Herbicide Group
2 - thifensulfuron
(Refer to page 45)

Company:

E. I. duPont Canada (PCP#22002)

Formulation:

***Pinnacle SG* (PCP#29349):** 50% thifensulfuron methyl as a water soluble granule.
Container size - 8 x 12 g water soluble pouches.

Crops and Staging:

Soybean - First fully expanded trifoliate leaf to flower initiation. (*Tolerance best when applied up to 2nd trifoliate stage*)

Weeds, Rates and Staging:

Apply up to 4 inches (10 cm) tall or wide:

***Pinnacle SG* at 3.3 g per acre will control:**

Lady's-thumb	Wild Mustard
Redroot pigweed	

***Pinnacle SG* at 4.8 g per acre will control the weeds above plus:**

Lamb's-quarters	Velvetleaf *

(one container treats 28.5 to 20 acres).

Requires the addition of a non-ionic surfactant such as *Agral 90*, *Agsurf II*, or *Citowett* at 1 L per 1000 L of spray solution. Oil surfactant blends such as *Assist* **at 0.4 to 0.8 L/ acre**, or *Sure-Mix* **at 0.5 L per 100 L of spray solution** may be used as adjuvants (check label for use rates).

* **The addition of 28-0-0 liquid fertilizer at 4 L per 100 L of** spray solution or 2.4 kg of 46-0-0 dry urea fertilizer may improve control of velvetleaf. Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum of 45 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when **using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a** combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Pinnacle applied to crops that have been under stress before application may result in crop injury. Stress conditions within 3 days after application may also result in crop injury.

Weeds under stress conditions at the time of application **may not be adequately controlled.**

Stress conditions are severe weather conditions, frost, low fertility, drought, water-saturated soils, and disease or insect damage.

Injury symptoms can be crop discoloration (yellowing, purpling or reddening of leaf veins), or stunting.

Tank Mixes:

Herbicides:

Assure II (0.2 L/acre) **plus** *Sure-Mix**.
Basagran (0.71 **or** 0.91 **L/acre) plus** *Assist* **adjuvant*.**
Basagran Forté (0.71 **or** 0.91 **L/acre)*.**
Assure II (0.25 **L/acre) plus** *Basagran Forté* (0.71 or 0.91 L/acre) **plus** *Sure-Mix* **adjuvant*.**

* **Refer to appropriate labels for** *Pinnacle* and adjuvant rates of application.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Pinnacle* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: If rainfall occurs soon after application control may be reduced. Several hours of dry weather are needed after application to allow uptake by the plants.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze or cut for feed.

Preharvest: Leave 60 days from application to harvest.

Re-cropping Interval: DO NOT plant any crop other than wheat or barley for 30 days after application.

Aerial Application: DO NOT apply by air.

Storage: Store in closed original container in a dry area away from food or feed.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy. Hand-held or backpack sprayers, inter-row hooded sprayers and spot treatments **are exempt from buffer zone requirements.**

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Pinnacle can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray *Pinnacle* should be flushed out immediately after use. Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

⚠ Warning: Contains the allergen milk.

For an explanation of the symbols used here see page 11.

Pixxaro

Herbicide Group
4 – halauxifen,
fluroxypyr and MCPA
(Refer to page 45)

Company:

Dow AgroSciences (PCP#31303)

Formulation:

The *Pixxaro* package contains 2 components:

Pixxaro A **(PCP#31303):** 16.2 g/L halauxifen and 250 g/L fluroxypyr present as ester and formulated as an emulsifiable concentrate.

Container size – 1 x 4.9 L.

Pixxaro B/Plus M Ester 600 **(PCP#29622):** 600 g/L MCPA ester formulated as an emulsifiable concentrate.

Container size – 1 x 9.45 L.

Crops and Staging:

Wheat (spring, durum, winter) and barley:
3 leaf stage to just prior to emergence of the flag leaf.

Weeds and Staging:

Apply to actively growing weeds up to 10 cm high or wide unless otherwise specified:

Weeds Controlled:

Burdock (prior to 4 leaf)
Canada thistle (up to 30 cm)*
Chickweed††
Cleavers (1 to 9 whorl)
Cocklebur
Dandelion (rosettes up to 30 cm in diameter) *
Fleabane, Canada†
Flixweed
Hemp-nettle††
Kochia†
Lamb's-quarters††
Marshelder (false ragweed)
Mustard (ball, wild)
Plantain, common
Prickly lettuce
Ragweed (common, giant)
Redroot pigweed††
Round-leaved mallow (up to 6 leaf)
Shepherd's-purse (up to 20 cm)
Smartweed (green, lady's-thumb)*
Sow-thistle, annual* (up to 4 leaf)
Stinkweed
Stork's-bill††
Vetch
Volunteer alfalfa (up to 25 cm)
Volunteer canola††
Volunteer flax†
Wild buckwheat††
Wild radish
Wild sunflower (annual)

* Suppression only.
† Up to 15 cm in height.
†† 1 to 8 leaf stage.

Rates:

Pixxaro A: 125 mL per acre (one 4.9 L jug treats 40 acres).

Pixxaro B: 236 to 283 mL per acre. Use the 283 mL per acre rates for improved control of heavy infestations or larger redroot pigweed or smartweeds.

Application Information:

Water Volume:
Ground: Minimum 20 to 81 L per acre.
Aerial: Minimum 12 L per acre.

Nozzles and Pressure: Use 30 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Weeds and crops must be actively growing. Weeds hardened off by cold weather or drought stress may not be adequately controlled or suppressed and re-growth may occur.

Tank Mixes:

Herbicides:
Sping wheat (including durum) and barley:
Fenoxaprop 120 EC (0.31 L/acre)
Liquid Acheive (0.2 L/acre plus adjuvant)
Puma Advance (0.41 L/acre)
Spring Wheat (including durum):
Clodinafop 240 EC (93 mL/acre plus adjuvant)
Everest 2.0 (14.5 to 29 mL/acre plus adjuvant)
Horizon NG (376 mL/acre)
Traxos (0.5 L/acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the Pixxaro label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry Interval: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze livestock within 7 days of application. DO NOT cut for silage or hay within 21 days of application.

Pre-harvest Interval: DO NOT harvest crops within 60 days of application.

Re-cropping Interval: Barley, canola, corn, flax, field peas, mustard (oriental, brown and yellow and oilseed quality (*B. juncea*) varieties), oats, soybean, spring wheat and sunflower may be seeded the first spring following application. Lentils may be grown the second season after application.

Aerial Application: May be applied by air.

Storage: Store over winter in a heated, dry place in original container.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field sprayer	1	1	2
Aerial (Fixed wing)	5	1	80
Aerial (Helicopter)	5	1	65

See page 36 for an explanation of the different habitats.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. Check the cleanout requirements of pesticides mixed with this product. Additional cleanout measures may need to be integrated into those provided here.

Hazard Rating:

Pixxaro A:

◇ Warning – Skin and Eye Irritant.

▽ Caution - Potential skin sensitizer.

Pixxaro B:

◈ Warning - Poison

For an explanation of the symbols used here see page 11.

Poast Ultra

Herbicide Group
1 - sethoxydim
(Refer to page 45)

Company:

BASF Canada (PCP#24835)

Formulation:

450 g/L sethoxydim formulated as an emulsifiable concentrate.

Container size - 2 x 7.7 L

Crops, Rates and Staging:

Crops are tolerant at all growth stages. However, the Preharvest interval outlined in the "Restrictions:" section must be followed to avoid unacceptable residues of sethoxydim in harvested crops.

To a maximum of 0.13 L per acre:
Borage

To a maximum rate of 0.19 L per acre:
Chickpea

To a maximum rate of 0.23 L per acre:
Tame buckwheat

To a maximum rate of 0.26 L per acre:

Alsike clover**
Caraway
Cicer milkvetch**
Coriander
Dill
Safflower
Sainfoin**
Solin (low linolenic acid flax)
Sweet clover**

To a maximum rate of 0.45 L per acre:

Alfalfa
Alsike clover*
Canola
Chickling vetch
Cicer milkvetch*
Creeping red fescue (for seed only)
Dry beans (adzuki, kidney, lima, mung, pinto, white)
Dry field peas
Fababeans
Fenugreek
Lentil
Lupin
Mustard
Potatoes
Sainfoin*
Flax (NOT including Solin - low linolenic acid flax)
Shelterbelts
Soybeans
Sunflower
Sweet clover*

* Established stands
** Seedling stands

Weeds, Rates and Staging:

Optimum yield response occurs when weeds are controlled early.

WEEDS AND STAGES	STAGING	RATE (L/ACRE)	ACRES TREATED PER 7.7 L CONTAINER
Green or yellow foxtail, barnyard grass, volunteer corn, Persian darnel, proso millet, witchgrass, large crabgrass	1 to 6 leaf	0.13	60
Wild oats, volunteer wheat, oats and barley	1 to 6 leaf stage except for low rate (See footnote*)	0.13* or 0.19	60 or 40
Quackgrass suppression	1 to 3 leaf stage	0.19	40
Quackgrass (season long control)	1 to 3 leaf stage	0.45	17
Foxtail barley suppression	prior to tillering	0.45	17

* Use the low rate in canola, flax and peas only when

- wild oat, volunteer wheat and volunteer barley are from 1 to 4 leaves (best results prior to tillering)
- under ideal growing conditions (adequate moisture, good fertility and moderate temperatures (15 to 28°C). DO NOT apply under stress conditions.
- with water volumes between 20 to 40 L per acre.

***Merge Adjuvant* (sold separately):** Must always be used with *Poast Ultra*. When *Poast Ultra* is applied alone use *Merge* at 0.5 L to 1.0 L per 100 L of total spray solution. When applying to quackgrass and/or foxtail barley use *Merge* at 1.0 L per 100 L of spray solution. See the tank mix section for *Merge* rates for tank mixing. *Merge* should be added at rates of 0.10 to 0.20 L per acre when applied by air.

Application Information:

Water Volume:
Ground: 20 to 40 L per acre
40 L to 81 L per acre if crop or weed growth is dense, and when spraying quackgrass.
Aerial: 10 to 20 L per acre

Nozzles and Pressure: Use 40 to 45 psi (275 to 300 kPa) with conventional 80° or 110° flat fan nozzles tilted forward at an angle of 45°. Low drift nozzles may require higher pressures for proper performance. Contact the herbicide manufacturer regarding the suitability of low drift nozzles for use with this product. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Most effective control is achieved when grasses are actively growing. Weeds stressed by drought, flooding, hot or prolonged cool temperatures (<15°C) and poor fertility are more difficult to control. Use the higher of the recommended rates for grasses stressed for less than 20 days. DO NOT apply to grasses stressed more than 20 days because of lack of moisture. Control may be reduced if temperatures are below 15°C. Subsequent tillering may occur under stress conditions or if fertility is low.

Tank Mixes:

Herbicides: The following tank mixes can be applied with 0.13 to 0.19 L/acre of *Poast Ultra*.

***Merge* Adjuvant (sold separately):** Use at 0.75 to 1.0 L of *Merge* per 100 L of mixed spray solution for most mixes except when mixing with *Pursuit* use 1.0 L per 100 L of solution.

In Flax:
Buctril M (0.4 L/acre)(including Solin).
Logic M (0.5 L/acre)(including Solin).
Lontrel 360 (0.23 to 0.34 L/acre).
Lontrel 360 (0.23 to 0.34 L/acre) + *MCPA* Ester (0.28 to 0.38 L/acre - 600 g/L formulations).
MCPA Ester (up to 0.38 L/acre - 600 g/L formulations)
The above tank mixes may reduce grass control, especially under adverse weather conditions.

In Canola:
Lontrel 360 (0.17 to 0.34 L/acre).
Muster (8 to 12 g/acre).
Lontrel 360 (0.17 L/acre) + *Muster* (8 g/acre) + *Merge* (0.4 L/acre).

In Liberty Link Canola only:
Poast Ultra (0.09 L/acre) + *Liberty* (1.08 L/acre)

In Field Pea:
Poast Ultra (0.19 L/acre) plus *Merge* (0.4 L/acre) may be tank mixed with:

***Pursuit* (40 mL/acre) to control:**

Chickweed
Cleavers
Hemp nettle (peas only)
Redroot pigweed (light infestations only)
Smartweed
Stinkweed
Volunteer canola (non-CLEARFIELD varieties)
Wild buckwheat (light infestations only)
Wild mustard

The company does not provide guidelines for weed densities under light infestations. When in doubt, use the higher rate below or contact the manufacturer.

Pursuit (85 mL/acre) for all weeds on the *Pursuit* label.

Check label directions for mixing order and additional timing restrictions for broadleaf partners.

Allow 4 days between application of *Poast Ultra* and application of herbicides other than those registered for tank mixing. Allow 5 days between application of *Sencor* and *Poast Ultra*. Allow 14 days for regrowth when applied in sequence with a grass control herbicide.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Poast Ultra* label only.
Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-Entry: DO NOT enter treated field for 12 hours.

Grazing: DO NOT graze the treated crop or cut for feed prior to crop maturity. Forage legumes may be cut after the specified Preharvest interval.

PREHARVEST INTERVAL (DAYS)	CROPS
30	Forage legumes (excluding alfalfa)
60	Dry peas, fenugreek, flax
65	Lentil, chickpea
70	Canola, chickling vetch, alfalfa, borage
76	Mustard
80	Potato, dry bean, soybean, fababean, lupin
85	Buckwheat
86	Solin
90	Safflower
105	Sunflower

Re-cropping: DO NOT plant cereals or grass within 14 days of application.

Aerial Application: May be applied by air.

Storage: May be frozen.

Buffer Zones:

Application method	Crops	Buffer Zones (metres†) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
Ground*	All	1	0	2
Fixed wing airplane	Food or feed crops	1	0	70
	Shelter-belts	5	0	150
Helicopter	Food or feed crops	1	0	60
	Shelter-belts	1	0	85

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using** shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance from downwind edge of spray boom and non-target area.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16. Empty and clean spray tank using this method if an oil film accumulates.

Hazard Rating:

☠ Caution – Poison

⚠ Caution – Eye and Skin Irritant

For an explanation of the symbols used here see page 11.

Predicade

Herbicide Group

2 – thifensulfuron/tribenuron, thiencarbazone

4 – fluroxypyr, MCPA

(Refer to page 45)

This product is a prepackaged tank mix of *Predicade Broadleaf* (equivalent to Barricade SG page 105), *Predicade Grass* (equivalent to Varro page 334), *Perimeter II* (see *Barricade II* page 105), and *NuFarm MCPA Ester 600* (page 237). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

E.I. DuPont Canada

Formulation:

The *Predicade* package contains the following components:

Predicade Broadleaf **(PCP#31713):** 25% thifensulfuron methyl and 25% tribenuron methyl formulated as a soluble granule.
Container size - 486 g

Predicade Grass **(PCP#31735):** 10 g/L thiencarbazone-methyl formulated as a suspension concentrate.
Container size – 8 L.

Perimeter II **(PCP#30094):** 333 g a.e./L formulated as an emulsifiable concentrate.
Container size – 3.4 L.

Nufarm MCPA Ester 600 **(PCP#27803):** 600 g a.e./L MCPA ester formulated as an emulsifiable concentrate.
Container size - 7.6 L.

Crops and Staging:

Spring wheat (including durum):

Apply from the fully emerged 3 leaf to 6 leaf stage, with a maximum of three tillers, and before the first node can be felt in the stem. DO NOT apply beyond 35 days of emergence.

Winter wheat:

Spring application from the 3 tiller stage and before the first node can be felt in the stem.

DO NOT apply after the presence of the first node as crop injury may occur.

Rates

Predicade Broadleaf: 12 g / acre
Predicade Grass: 0.2 L / acre
Perimeter II: 85 mL / acre
MCPA Ester 600: 190 mL / acre
One case treats 40 acres

Weeds and Staging:

Weeds controlled by *Barricade II* and *Varro* plus:

Dandelion (spring and fall rosettes, up to 15 cm in diameter)
Scentless chamomile
Volunteer canola (all varieties) - 2 to 4 leaf
White cockle

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Prestige XC

Herbicide Group

4 - fluroxypyr, clopyralid & MCPA

(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

The *Prestige XC* package has 2 components:

Prestige XC A **(PCP#29462):** 333 g a.e./L fluroxypyr

Container size - 3.3 L or in bulk package 4 x (2 x 9.9 L)

Prestige XC B **(PCP#29465):** 50 g/L clopyralid and 280 g/L *MCPA ester.*

Container size - 2 x 8.0 L or bulk package 4 x 96 liter.

All of the above components are formulated as an emulsifiable concentrates.

Crops and Staging:

Cereals:

Spring wheat (including durum), winter wheat (apply in the spring), barley, oat and canaryseed*

Forage Grasses* grown for seed production:

Seedling and established stands - 4 leaf until the emergence of the flag leaf.

Bromegrass (meadow, smooth)
Fescue (creeping red, tall)
Timothy
Wheatgrass (crested, intermediate)

* *NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this product on forage grasses and canary seed do so at their own risk.***

Weeds, Rates and Staging:

Unless otherwise stated, the following weeds will be controlled if sprayed in the 2 to 4 leaf stage.

Prestige XC A **at 0.13 L per acre;** ***Prestige XC B*** **at 0.6 L per acre (one case treats 27 acres or bulk treat 640 acres) controls:**

Burdock
Canada thistle
(light infestations)
Cleavers (1-8 whorls)
Field horsetail†
Flixweed (spring seedlings only)
Kochia
Lamb's-quarters
Plantain†
Prickly lettuce
Ragweeds
Shepherd's-purse
Stinkweed
Stork's-bill (1-8 leaf)
Vetch
Volunteer flax (1-12 cm)
Volunteer sunflower
Wild annual sunflower
Wild buckwheat (1-8 leaf)
Wild mustard
Wild radish

The 480 acre per bulk container rate of ***Prestige XC*** **or the 20 acre per case rate** ***(Prestige XC A*** **at 0.17 L per acre;** ***Prestige XC B*** **at 0.8 L per acre) controls the above weeds plus:**

Annual sow-thistle
Canada thistle*
(moderate to heavy infestations)
Chickweed (up to 6 cm)
Common groundsel
Dandelion**
Hemp-nettle (2-6 leaf stage)
Perennial sow-thistle*
Redroot pigweed
Round-leaved mallow
(1 to 6 leaf)
Russian pigweed
Scentless chamomile
Smartweed
Tartary buckwheat
Volunteer canola

* Spray when 4 to 6 inches (10 to 15 cm) high. Season long control, with some regrowth in the fall.

** Spring rosettes only.

† Top growth control only.

Application Information:

Water Volume:

Ground: 20 to 40 L per acre.

Aerial: 12 to 20 L per acre. Consult label for buffer zones.

Nozzles and Pressure: Maximum 30 to 40 psi (200 to 275 kPa) with conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use nozzles and pressure designed to deliver proper coverage with ***ASABE coarse*** droplets. Tilt nozzles forward at a 45° angle to improve coverage of vertical targets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

The activity of the *Prestige* is influenced by weather conditions. The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost 3 days before or after application may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions (drought or heat stress) or if heavy infestations exist.

Tank Mixes:

Herbicides:

In spring wheat (including durum) and barley:

Liquid Achieve (0.2 L/acre) plus *Turbocharge* adjuvant.

Assert (0.53 to 0.65 L/acre) plus acidifier.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Prestige XC* label only.

Adding ingredients in the correct order is critical for optimum performance.

Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours of post-emergent application may result in reduced weed control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT cut or graze treated fields of wheat, barley or canaryseed for 7 days after application. DO NOT cut treated forage grass fields for hay or forage. DO NOT graze treated forage grass fields.

Preharvest Interval: DO NOT harvest crop within 60 days of application.

Re-cropping: Wheat, oat, barley, rye (not under-seeded to forage legumes, clover or alfalfa), flax, canola, field pea* and mustard may be seeded the season following application.

*NOTE: DO NOT seed to field pea for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field pea grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application delay seeding field pea an additional 12 months (22 months following application). Contact your local Dow AgroSciences representative or retailer for more information before seeding field peas following drought conditions in the previous year.

DO NOT seed legume forages or crops other than those listed above until the second season following application.

Aerial Application: May be applied by air.

Storage: Store product in original containers in a secure, dry, heated area. If the product is frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	1
Fixed Wing aircraft	4	0	60
Helicopter	1	0	50

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method C' in the general seciton on sprayer cleaning on page 15 to 16.

Hazard Rating:

☠ Danger - Poison.

⚠ **Warning - Eye and Skin Irritant**

Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Primextra II Magnum

Herbicide Group
15 - metolachlor
5 - atrazine
(Refer to page 45)

Company:

Syngenta Canada (PCP#25730)

Formulation:

400 g/L of s-metolachlor + 320 g/L of atrazine formulated as a liquid.

Container size - 2 x 10 L.

Crops and Staging:

Corn - Preplant incorporated (PPI) or Pre-emergence if irrigated within 10 days of application.

Weeds and Staging:

Apply prior to the emergence of weeds. Weeds that have emerged prior to application will not be controlled.

American nightshade
Barnyard grass
Buckwheat
Eastern black nightshade
Foxtail (green, yellow)
Lamb's-quarters
Prostrate pigweed
Purslane
Ragweed
Redroot pigweed
Smartweed (lady's-thumb)
Wild mustard
Witchgrass
Yellow nutsedge*

* Herbicide must be incorporated for best control.

Rates:

WEED POPULATIONS	RATE (L/ACRE)	ACRES TREATED PER 14 L CONTAINER
Light infestations	1.2	11.7
Medium infestations	1.4	10
Heavy infestations	1.6	8.8

DO NOT apply to soils with less than 1% or more than 10% organic matter.

Application Information:

Water Volume: 61 L per acre

Pressure: 30 to 45 psi (200 to 300 kPa).

Nozzles: Flat fan with 50-mesh nozzle screens.

Incorporation:

Incorporate using S-tine or C-tine cultivators or tandem disk. DO NOT incorporate deeper than 4 inches (10 cm).

To ensure that the product remains in the top 2 inches (5 cm) of soil, apply to a firm seedbed free of large clods or lumps. If using tandem disks, set disks to work the soil at a depth of 4 inches (10 cm) and operate at a speed of 4 mph (6 km/hr). If using an S-tine cultivator, set the implement to work the soil to a depth of 4 inches (10 cm) and operate at a speed of 6 mph (10 km/hr).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Extended periods of dry soil conditions may result in reduced weed control. Moderate rainfall after application will enhance activity. Heavy rainfall following application of *Primextra II Magnum* may dilute the metolachlor deeper than 2 inches (5 cm) and result in reduced weed control, particularly on light textured soils.

Tank Mixes:

Herbicides: None registered.

Insecticides: None registered.

Fertilizers: May be tank mixed with liquid fertilizer for preplant incorporated applications. Conduct a compatibility test by performing a jar test prior to mixing the products in the tank. May be impregnated onto dry bulk fertilizers (except nitrate or superphosphate fertilizers or limestone).

Note: The above mixes are those listed on the *Primextra* label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Moderate rainfall shortly after application will enhance activity. Heavy rainfall reduces weed control by leaching the chemical out of the top few centimeters of soil. **Inadequate rainfall after application (within 10 days) will** cause reduced weed control.

Re-entry: DO NOT re-enter treatment area within 12 hours of application.

Grazing: DO NOT graze or cut corn for feed before ear emergence.

Re-cropping: This product contains *Atrazine*. All crops except corn and triazine-tolerant canola may be affected the year following the use of *Atrazine*. Other more sensitive crops may be affected two or more growing seasons after application.

Aerial Application: DO NOT apply by air.

Storage: Store in a dry place.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic habitat	Terrestial habitat
Ground only*	29	10

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT mix or load this product within 30 m of any sensitve aquatic habitats

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Ratings

▽ Caution Poison

▽ Caution - Eye Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Prism SG

Herbicide Group
2 - rimsulfuron
(Refer to page 45)

Company:

E. I. duPont Canada (PCP#30057)

Formulation:

25% rimsulfuron formulated as a water soluble granule. Container size - 480 g.

Crops and Staging:

Irrigated potato* prior to flower initiation.

Potato tolerance differs by variety. Limit first use to a small area of each variety prior to widespread adoption in the field. Delay cultivation for 7 to 10 days after application.

* *NOTE - Since applications to irrigated potato in western Canada has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to irrigated potato in western Canada is at the risk of the user.***

Weeds and Staging:

WEED	STAGE
Barnyard grass Green foxtail Yellow foxtail Witchgrass	1 to 6 leaf stage, maximum 2 tillers
Quackgrass	3 to 6 leaf stage (less than 10 inches or 25 cm leaf extended).
Redroot pigweed Lamb's-quarters (suppression only)	4 to 6 leaf stage (less than 4 inches or 10 cm tall or across).

Rates:

24 g per acre (one package treats 20 acres).

Add a recommended non-ionic surfactant such as *Citowett Plus*, *Agsurf II*, or *Agral 90* at 0.2 L per 100 L spray solution.

Make only one application per growing season.

Refer to the product label for complete mixing instructions for this product and its mixes.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 40 L per acre.

Nozzles and Pressure: 25 to 40 psi (175 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Apply when the temperature 24 hours before and after application is between 5ºC and 28ºC. Temperatures beyond this range increase the potential for crop injury. Rapid fluctuations in temperature will stress the crop (greater than a 20ºC difference within 24 to 36 hours). Allow 48 to 72 hours for the crop to acclimatize before spraying if severe temperature fluctuations occur. Crop injury may result if applications are made when potatoes are stressed by abnormally hot, humid, or cold weather conditions, frost, low fertility, drought, water saturated soil, compacted soil, previous pesticide applications, disease or insect damage. If potatoes have been injured by frost, wait 48 to 72 hours after normal growing conditions have resumed before applying.

Warm, moist conditions after application promote good weed control while cool and / or dry conditions may reduce or delay activity. Weeds hardened off by cold weather or drought stress may not be controlled.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Within 2 to 4 hours may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Preharvest: Leave 30 days from application to harvest.

Grazing: DO NOT graze the treated crop or cut for hay.

Re-cropping: Spring barley, soybean, white bean, red clover, sorghum, potato and field corn may be planted the year after application. Winter wheat may be planted 4 months after application. For all other crops, a field bioassay is recommended before planting.

Aerial application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	5

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT apply in areas where surface water from the treated area can run off to adjacent cropland, streams, irrigation water or wells.

Sprayer Cleaning:

Refer to 'Method A' found in the general sprayer cleaning section on page 15 to 16. Check the label or contact the manufacturer for more specific sprayer cleaning information information.

Hazard Rating:

⚠ Warning - Eye Irritant

Warning - Contains the allergen sodium sulfite.

For an explanation of the symbols used here see page 11.

Pulsar

Herbicide Group
4 - dicamba & fluroxypyr
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

86.9 g / L dicamba and 113.3 g / L fluroxypyr formulated as an emulsifiable concentrate.
Container size 2 x 9.82 L, 78.6 L

Crops and Staging:

Barley and spring wheat (including durum) from the 2 to 5 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Unless otherwise indicated apply when weeds are at the 2 to 3 leaf stage and rosettes are less than 2 inches (5 cm) across.

At 246 mL per acre (80 acre per case) *Pulsar* controls:

Cleavers
Kochia (up to 9-leaf)
Wild buckwheat*

At 371 mL/acre (53 acre per case) *Pulsar* controls the weeds above plus:

Lamb's-quarters*
Redroot pigweed*
Russian thistle
Stork's-bill*
Volunteer flax
Wild buckwheat (up to 9 leaf)

* Suppression only

Application Information:

Water Volume: Minimum 44.5 L per acre.

Nozzles and Pressure: For conventional flat fan nozzles use a maximum pressure between 40 and 45 PSI (275 to 310 kPa) for the preformulated product. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium droplets***.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

Tank Mixes:

Herbicides:
Barley, Spring wheat, and durum only:
MCPA LV600 ester (0.23 L / acre)

Spring wheat, and durum:
Horizon NG (376 mL / acre)
Horizon NG (376 mL / acre) plus *MCPA LV600 ester* (0.23 L / acre)
Traxos (label rate)
Traxos (label rate) + MCPA Ester (rates above)

Fertilizers: None registered

Note: The above mixes are those listed on the *Pulsar* label only.

Syngenta also supports the following mixes that are not on the *Pulsar* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides:

2,4 D Ester, 2,4 D Ester + Sierra 2.0, Express SG, Refine SG, Sierra 2.0.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Preharvest: Leave 60 days between treatment and harvest.

Grazing: Treated crops may be grazed, or cut for hay or silage after 7 days when used alone, or a minimum of 12 days when mixed or longer if the intervals are longer for the tank mix partner.

Re-cropping: Wheat, barley, oats, rye, forage grasses, flax, canola, mustard, lentils and peas may be grown the following season. There are no recropping restrictions the second year after application.

Aerial Application: DO NOT apply by air.

Storage: May be frozen. If frozen, bring to room temperature and agitate before use. This product is combustible. DO NOT store near heat or open flame.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic habitat	Terrestial habitat
Ground only*	15	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Legumes are particularly sensitive to *Pulsar.*

Handheld or backpack applications do not require a buffer.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

☠ Danger – Poison

◇ Warning – Eye Irritant

▽ Caution – Skin Irritant.

For an explanation of the symbols used here see page 11.

Quinclorac

Herbicide Group

4 – quinclorac (broadleaves)
26 – quinclorac (grasses)
(Refer to page 45)

Company:

Manufactured by Productierra for sale by Great Northern Growers (*Clever* - PCP#31365)

Univar Canada (*Masterline Quinclorac* - PCP#31753)

Formulation:

75% percent quinclorac formulated as a dry flowable.
Container size - 1 kg bags.

Crops and Staging:

Spring wheat (including durum) - 1 to 5 leaf.
Canola - 2 to 6 leaf
Mustard (brown, oriental) - 2 to 6 leaf
When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Note: Import tolerances (Maximum Residue Limits) for quinclorac residues in canola and mustard have yet to be established by certain importing countries. Producers should check with their commodity buyer before application.

Weeds, Rates and Staging:

Apply *Quinclorac* at 55 to 67* g per acre (18 to 15 acres per case) plus *Merge* adjuvant (purchased separately) at 1 L per 100 L of spray solution to control:

Grasses:
Barnyard grass (1 to 5 leaves)
Green foxtail* (1 to 5 leaves, up to 2 tillers)

Broadleaves:
Cleavers (1 to 3 whorls)
Volunteer flax (1 to 8 cm)
Sow-thistle (annual and perennial)**

* Use the high rate for heavy infestations of green foxtail only. For clarification of what constitutes a heavy infestation contact the manufacturer.

** Suppression only.

DO NOT apply products that contain quinclorac more than once every two years.

Early treatment of weeds is important to maximize crop yield potential by eliminating early weed competition. Refer to broadleaf tank mix partner for additional timing restrictions.

Application Information:

Water Volume: Minimum 45 L per acre.

Nozzles & Pressure: 40 to 60 psi (275 to 425 kPa) when using standard flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with a minimum of drift. Flat fan nozzles may be tilted forward 45 degrees to improve coverage on vertical surfaces (i.e. grasses). Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crop that is under stress from conditions such as frost, hail, flooding, drought or extremes in temperature. Cool weather may delay weed control and if prolonged may result in poor weed control.

Tank Mixes:

Herbicides: When mixing with broadleaf partners a slight reduction in green foxtail control may result. If spraying for green foxtail, use the high rate of *Quinclorac*.

In spring wheat (including durum) only:

2,4-D amine or ester (160 to 212 g ae/acre)
Buctril M (0.40 L/acre)
MCPA amine or ester (0.34 to 0.45 L/acre - 500 g/L formulations)

Add *Merge* adjuvant at 1 L per 100 L spray solution for all tank mixes. Refer to individual product labels for application details such as staging and varietal restrictions.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Allow 4 days between the application of *Quinclorac* and any other chemical not listed as a tank mix.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours may reduce control.

Re-Entry: DO NOT enter treated fields for 12 hours after application.

Grazing: DO NOT graze or cut for feed within 77 days of application.

Preharvest: DO NOT harvest wheat within 77 days of application. DO NOT harvest canola or mustard within 60 days of application.

Recropping: In case of crop failure, only barley or spring wheat (including durum) may be reseeded the same year. Barley, canola, field peas, sunflowers and wheat may be grown the year after application. Flax and lentils may be grown the second year after application. On low organic matter soils or under dry conditions, flax and lentils should not be grown until the third year after application. DO NOT use *Quinclorac* on land where potatoes or vegetables are grown.

Aerial Application: DO NOT apply by air.

Storage: May be frozen. Should product freeze, warm to room temperature before using.

Buffer Zones: DO NOT apply within 10 metres of aquatic habitats. Avoid drift onto terrestrial habitats. See page 36 for a description of these habitats.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution – Poison

▽ Caution – Eye and Skin Irritant

For an explanation of the symbols used here see page 11.

Quizalofop

Herbicide Group
1 - quizalofop
(Refer to page 45)

Company:

E. I. duPont Canada (*Assure II* - PCP#25462)

Gowan Canada (*Yuma GL* - PCP#30100)

Formulation:

96 g/L quizalofop-P-ethyl formulated as an emulsifiable concentrate.

Container size:
Assure II - 8 L *Assure II* + 8 L *SureMix* adjuvant, or
500 L *Assure II* + 500 L *SureMix* adjuvant.
Yuma GL - 8 L *Yuma GL* + 8 L *XA Oil Concentrate.*

Crops and Staging:

Annual Crops: No leaf stage restrictions, but do not apply beyond Preharvest intervals listed in the table:

CROP	PREHARVEST INTERVAL (DAYS)	MAX LEAF STAGE
Camelina*	64	
Canola	64	
Chickpea	85	
Dry Edible Bean*†	30	
Ethiopian Mustard *(Brassica carinata)**	64	
Faba Bean*	30	
Flax, or Solin (low linolenic acid flax)	82	
Hemp (for fibre, seed, or oil)*††	73	6 leaf (up to 25 cm)
Lentil	65	
Oriental mustard (condiment types and oilseed quality types *Brassica juncea)*	64	
Pea (field and processing)	65	
Soybean	80	
Sunflower*††	60	
Yellow and Brown Mustard††	64	

† **NOTE:** While *Quizalofop* has been registered for use on all dry field bean types not all types have been tested for tolerance. When using *Quizalofop* on a new dry bean type or variety for the first time evaluate tolerance on a small area first before applying large acreages and check with seed supplier for variety sensitivity.

†† *Assure II* only.

Forage Crops (seed production only):

Seedling or Establish: Alfalfa, alsike clover*, red clover*, creeping red fescue.

Seedling only: Bird's-foot trefoil*, white clover*, sweet clover*, and sainfoin*.

* *NOTE - Since applications to these crops have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to these crops is at the risk of the user.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Apply *Quizalofop* according to weed stage below to the **maximum rates of 0.3 L per acre for all crops except Ethiopian mustard** (*B. carinata*) where the maximum rate **is 0.2 L per acre.**

Add one of the following registered adjuvants to the spray **tank when applying quizalofop:**

SureMix, *Merge* or *Liberate* (0.5 L per 100 L of spray solution)
LI700 (0.25 to 0.5 L per 100 L of spray solution).

XA Oil Concentrate (0.5 to 1.0 L per 100 L of spray solution)**

Use the higher rate of *XA Oil Concentrate* when wild oats or quackgrass are present in the field or when growing conditions are poor.

** Use *XA Oil Concentrate* with *Yuma GL* only.

WEED	STAGE	RATE	
		L/ACRE	ACRES PER 8 L
Green foxtail	2 leaf to early tillering	0.15	54
Volunteer wheat, barley & oat*	2 leaf to early tillering	0.15	54
Volunteer corn	2 to 6 leaf stage	0.15	54
Wild oat*	up to 2 tillers	0.20	40
Barnyard grass, yellow foxtail, proso millet, old witchgrass	2 leaf to early tillering	0.20	40
Quack grass suppression	2 to 6 leaf stage		
Foxtail barley†	3 to 4 leaf max 3 tillers		
Downy and Japanese brome††	2 to 5 leaf stage		
Quack grass season long control	2 to 6 leaf stage	0.30	26

* Best results are likely to occur if applications are made before tillering begins. Apply at the 2 to 3 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering.

† Control with *Assure II* only and suppression with *Yuma GL*.

†† Control with *Assure II* only.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:

Ground: Minimum 40 L per acre. Up to 162 L per acre of water may be used under heavy populations to improve coverage.

Aerial: Minimum 10 L per acre to a maximum of 20 L per acre.

Nozzles and Pressure: 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop injury may occur if crops are stressed because of drought or flooding. Less than acceptable weed control may be expected if weeds are under stress because of drought, flooding or cool weather.

Tank Mixes:

Herbicides:

In Canola: *Muster* (8 to 12 g/acre).

In Dry Bean (Pinto, Pink, Great Northern and Small Red): *Basagran* (label rates with *Quizalofop* at 0.25 L/acre plus *SureMix* adjuvant)

In Oriental Mustard (B. juncea condiment and oilseed): *Quizalofop* (0.15 to 2.0 L/acre) plus *Muster* (8 g/acre) plus *SureMix* adjuvant. DO NOT use on yellow mustard as injury will result.

In Soybean:

Pinnacle (2.2 to 3.3 g/acre).

Quizalofop (0.25 L/acre) plus *Pinnacle* (2.2 to 3.3 g/acre) plus *Basagran Forté* (0.71 to 0.91 L/acre) plus *SureMix*.

In Tribenuron Tolerant Sunflowers:

Express SG (6 g/acre) plus *SureMix* or *Merge*.

In Established creeping red fescue for seed: *Quizalofop* at 0.2 to 0.3 L/acre may be tank mixed with *Ally* (3 g/acre).

Allow 24 hours after application before applying a broadleaf herbicide. If the broadleaf herbicide is applied first, wait 7 days before application of *Quizalofop*.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Quizalofop* label only.

***Quizalofop* manufacturers may also support mixes with pesticides that are not on the quizalofop labels. Check with each manufacturer for the products they support. Mixes must be applied according to the most restrictive use limitations for all products added to the tank.**

Herbicides: *Ares, Eclipse*, Glyphosate* (glyphosate tolerant canola and soybean only), *Liberty, Lontrel*, Lontrel+Muster*, Odyssey, Pursuit, Solo, Viper ADV.*

**Assure II* only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour of application may reduce control.

Re-Entry Interval: 4 days for Camelina and 12 hours for all other crops.

Grazing: DO NOT graze treated crops or cut for feed in the year of treatment.

Preharvest Interval: See '**Crops and Staging**' chart above.

Re-cropping: No restrictions the year after treatment.

Aerial Application: May be applied by air when used alone.

Storage: DO NOT freeze.

Buffer Zones:

Rates (L/acre)	Application method	Buffer Zones (metres†) Required for the Protection of:		
		Aquatic Habitats of Depths		Terrestrial habitat
		Less than 1 m	Greater than 1 m	
All rates	Ground *	1	0	3
Up to 0.15	Winged aircraft	0	0	70
	Helicopter	0	0	55
Up to 0.20	Winged aircraft	0	0	85
	Helicopter	0	0	70
Up to 0.30	Winged aircraft	1	0	125
	Helicopter	1	0	100

See page 36 for an explanation of the different habitats.

* Buffer zones for ground applications can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Cleanout is recommended but no specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

⛔ Danger - Corrosive to eyes

⚠ Skin irritant, Potential skin sensitizer

For an explanation of the symbols used here see page 11.

Reclaim

Herbicide Group

2 - metsulfuron
4 - aminopyralid & 2,4-D
(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

Reclaim has two components:

Reclaim A **(PCP#29751):** 52.5% aminopyralid + 9.45% metsulfuron methyl formulated as a water dispersible granule.
Container size - 1.84 kg

Reclaim B **(PCP#29750):** 564 g/L 2, 4-D Ester formulated as an emulsifiable concentrate.
Container size - 2 x 8 L

NOTE: Limited availability through selected retail outlets.

Crops and Staging:

Rangeland and pastures - Apply in spring or early summer.

Weeds, Rates and Staging:

Apply when weeds are young and actively growing in the vegetative stage.

Reclaim A: Apply at 92 g per acre.

Reclaim B: Apply at 0.8 L per acre.

One case treats 20 acres.

Weeds Controlled:

The following broadleaf weeds, invasive plants and shrubs will be controlled for 24 months after application.

Canada Thistle
Prairie sage
Dandelion
Wild Rose
Wolf willow (Silver berry)
Shrubby cinquefoil
Buckbrush (western snowberry)
Pasture sage (fringed sage)

Application Information:

Water Volume:
Ground application: 45 L per acre minimum. For better coverage apply at 80 L per acre.
Aerial application: 20 L per acre minimum

Nozzles and Pressure: Use a combination of application equipment and pressures that will apply ***ASABE coarse*** droplets in a uniform pattern. Drift of even small amounts of *Reclaim* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm, or temperature inversions).

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Application should be avoided when pasture and targeted weeds are under stress of drought, excess moisture, extreme heat or cold or other environmental stresses. Target weeds must be actively growing. Avoid applications when temperatures exceed 28°C.

Tank Mixes:

None registered

Restrictions:

Rainfall: No rainfast period is specified on the label. Contact manufacturer for more information.

Re-entry: DO NOT re-enter treated areas for 12 hours.

Grazing: DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated areas and feed untreated feed for at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application.

Re-cropping: DO NOT apply to pastures where legumes are an essential component. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 3 years after application.

Aerial Application: May be applied by air.

Storage: Store product in original, labeled containers in a secure, dry, cool area. DO NOT freeze.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic habitat	Terrestial habitat
Ground*	10	15
Fixed wing airplane	80 to 175**	250 to 750**
Helicopter	70 to 150**	175 to 650**

See page 36 for an explanation of the different habitats.
* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.
** Distance varies depending on spray droplet size. Consult the *Reclaim* label to determine buffer zone size when applying by air.
† Distance is measured from the downwind edge of the boom to sensitive areas.

DO NOT apply this product directly to any water body or mix or load near water or wells. DO NOT apply when heavy rains are forecast or on moderate to steep slopes toward sensitive areas or to light soils with shallow water table. Contact the provincial environment department for permits to apply near water.

Sprayer Cleaning:

Refer to 'Method A' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product such as *All Clear* or *Clean Out* spray cleaner. The inclusion of detergent in 'Method B' may provide improved cleaning. Contact the manufacturer for more information.

Hazard Rating:

☠ Warning - Poison

For an explanation of the symbols used here see page 11.

Reflex*

Herbicide Group
14 - fomesafen
(Refer to page 45)

***(For use only in the Red River Valley of Manitoba)**

Company:

Syngenta Canada (PCP#24779)

Formulation:

240 g/L fomesafen formulated as a solution.

Container size - 10 L.

Crops and Staging:

Soybeans and dry beans✧ in the 1 to 2 trifoliate leaf stage. DO NOT use before the 1st trifoliate leaf stage or increased risk of crop injury may result. For use in the Red River Valley of Manitoba only.

✧ *NOTE - Since applications to beans in the Red River Valley has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to beans is at the risk of the user.***

Weeds and Staging:

Broadleaf weeds controlled by *Basagran* at the 0.71 L per acre rate plus improved control of the following weeds up to the 4-leaf stage:

Cocklebur
Eastern black nightshade
Lady's-thumb
Lamb's-quarters
Ragweed (common)
Redroot pigweed*
Volunteer canola
Wild mustard

* Suppression only

Rate:

Reflex is registered in the Red River Valley of Manitoba only as a tank mix at a rate of 235 mL per acre *Reflex* plus 0.71 L per acre *Basagran* plus *Agral 90* at 1 L per 1000 L of spray solution.

Application Information:

Water Volume: Minimum 81 L per acre. Increase water volume to 142 L per acre for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.

Pressure: 275 kPa (40 psi). Increase pressure to 420 kPa (60 psi) for fields with heavy weed densities or with weeds at the upper limit of their recommended stage.

Nozzles: Use nozzles capable of delivering appropriate pressures and volumes.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Weed control and crop tolerance may be reduced under certain stress conditions such as cold temperatures, excess moisture, drought and injury from hail or previous herbicide applications.

Tank Mixes:

Herbicides: *Reflex* is only registered for use in a *Basagran* tank mix. See Rates.

Restrictions:

Rainfall: Within 4 hours may reduce control.

Grazing: DO NOT graze treated crop or cut for hay. There is insufficient data to support such use.

Preharvest: Leave at least 84 days from application to harvest.

Re-cropping: Winter wheat may be sown 4 months after application. Spring wheat, dry beans, soybeans and field corn may be grown the year following an application.

DO NOT apply *Reflex* to any field more often than once every 2 years.

These re-cropping restrictions refer only to the Red River Valley of Manitoba. Use outside this is region is not registered as re-cropping options have not been determined.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool place away from food or feed.

Buffer Zones: Leave a buffer zone of at least 15 m between the last spray swath and the edge of sensitive terrestrial areas such as shelterbelts, hedgerows and shrublands as well as aquatic areas such as ponds, streams, rivers, prairie potholes and sloughs. DO NOT apply when winds are greater than 15 km/hr.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

Danger – Corrosive to Eyes

For an explanation of the symbols used here see page 11.

Restore II

Herbicide Group
4 - aminopyralid & 2,4-D
(Refer to page 45)

Company:

Dow AgroSciences (PCP#30632)

Formulation:

40 g/L aminopyralid and 400 g/L 2,4-D both present as amine salts formulated as a solution.

Container size - 2 x 10 L

Note: Limited availability through selected retail outlets.

Use a maximum of one application of *Restore II* products or other products containing aminopyralid per season.

Crops and Staging:

Rangeland and pastures - Apply in spring or early summer.

Weeds, Rates and Staging:

Apply when weeds are young and actively growing in the vegetative stage for control unless indicated otherwise.

***Restore II* at 0.57 L per acre will control:**

Annual sow-thistle
Bull thistle
Burdock (<4 leaf)
Buttercup (hairy, tall)
Canada fleabane
Canada thistle††
Common broomweed
Common plantain
Daisy fleabane
Goat's-beard
Horse-nettle
Nodding thistle
Ox-eye daisy
Perennial sow-thistle
Prickly lettuce
Spotted knapweed
Stinging nettle
Sweet clover
Yellow star-thistle

As well as other annual "Susceptible Weeds" controlled by 2,4-D on the 2,4-D page.

***Restore II* at 0.86 L per acre will control:**
Weeds listed above plus:

Canada goldenrod††
Cudweed
Curled dock (<4 leaf)
Dog mustard
Groundsel
Hawkweed
Hairy fleabane
Heal all
Narrow-leaved hawk's-beard
Scentless chamomile
Sheep sorrel
Sulphur cinquefoil††
Tansy ragwort
Western ragweed

As well as other annual "Hard to Control Weeds" controlled by 2,4-D on the 2,4-D page.

***Restore II* at 0.97 L per acre will control:**
Weeds listed above plus:

Absinthe
Biennial wormwood††
Bindweed (Field and Hedge)††
Blue Lettuce††
Burdock††
Canada goldenrod††
Common tansy †††
Dandelion††
Diffuse knapweed†††
Fuller's teasel
Gumweed††
Hoary cress††
Ironweed (tall)
Leafy spurge††
Mouse-eared chickweed††
Russian knapweed†††
Yarrow (common)†††
Yellow rocket††

† Top growth control only.
†† Season long control.
††† Suppression only.

Application Information:

Water volume:
Ground application: 40 L per acre minimum.
Aerial application: 20 L per acre minimum

Nozzles and Pressure: Use a combination of application equipment and pressures that will apply ***ASABE coarse*** droplets in a uniform pattern.

Drift of even small amounts of *Restore* into sensitive plants or areas where sensitive crops may be grown can cause injury. DO NOT apply under conditions prone to drift (i.e. high winds, dead calm, or temperature inversions).

Avoid applications closer that the drip line or outer edge of the canopies of trees or injury may occur to the tree.

NOTE: Use closed handling systems when using bulk containers and/or if handling more than 663 L of product per day. Handheld applications are limited to 20 L of product per day. Respirators must be worn if applying more than 12.5 L per day using hand-held equipment.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Application should be avoided under conditions of drought or other environmental stress.

Tank Mixes:

None registered.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturer for more information.

Re-entry: DO NOT re-enter treated areas for 12 hours.

Grazing: DO NOT allow lactating dairy animals to graze treated areas within 7 days of application. Withdraw meat animals from treated fields at least 3 days before slaughter. DO NOT harvest forage or cut hay within 30 days of application. Allow 3 days of grazing on an untreated pasture (or feed untreated hay) before transferring livestock to areas where sensitive broadleaf crops may be grown.

Re-cropping: If legumes are essential in a pasture, DO NOT use *Restore*. DO NOT break up treated pasture and plant to sensitive broadleaf crops for at least 3 years after application of *Restore*.

Aerial Application: May be applied by air.

Storage: Store product in original, labelled containers in a secure, dry, cool area. DO NOT freeze.

Buffer Zones:

Handheld equipment is exempt from the buffer zones indicated below when implementing Early Detection and Rapid Response measures on isolated plants or patches. DO NOT apply to water.

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground *	10	10
Fixed wing airplane	80 to 175**	80 to 175**
Helicopter	70 to 150**	70 to 150**

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

** Distance varies depending on spray droplet size. Consult the *Restore II* label to determine buffer zone size when applying by air.

† Distance is measured from the downwind edge of the boom to sensitive areas.

DO NOT apply this product directly to any water body or mix or load near water or wells. DO NOT apply when heavy rains are forecast or on moderate to steep slopes toward sensitive areas or to light soils with shallow water table. Contact the provincial environment department for permits to apply near water.

Sprayer Cleaning:

'Method A' found in the general sprayer cleaning section on page 15 to 16.

Hazard Rating:

⚠ Danger – Eye and Skin Irritant

For an explanation of the symbols used here see page 11.

Retain SG

This product is a prepackaged tank mix of the equivalent of *thifensulfuron/tribenuron* (page 301) and *fluroxypy + 2,4-D* (page 184). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the component products see the product pages listed above.

Herbicide Group

2 - thifensulfuron & tribenuron
4 - fluroxypyr & 2,4-D
(Refer to page 45)

Company:

Loveland Products Canada

Formulation

The *Retain SG* package has 3 components:

Retain A **(PCP#30129):** 33.35% thifensulfuron + 16.65% tribenuron formulated as a water soluble granule.
Container size - 486 g

Retain B **(PCP#29557):** 180 g/L fluroxypyr formulated as an emulsifiable concentrate.
Container size - 4.8 L

Loveland Products Canada 2,4-D ester 700 **(PCP#29006):** 660 g/L 2,4-D ester formulated as an emulsifiable concentrate.
Container size - 6.8 L

Crops and Staging:

Spring wheat (including durum), barley - 4 leaf to flag leaf stage.

Weeds and Staging:

Apply from the seedling to 4 leaf or whorl stage of the following weeds:

Weeds controlled by *thifensulfuron/tribenuron* plus cleavers*

* Not Group 2 resistant biotypes

Rates

Retain A: 8 g per acre.

Retain B: 0.12 L per acre

Loveland Products Canada 2,4-D: 0.2 L per acre
One case per 40 acres

Add *Agral 90, Agsurf II,* or *Citowett Plus* at 0.2 L per 100 L of spray solution. *Retain SG* may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Tank Mixes:

Loveland Products Canada **supports the following mixes that are not on the *Retain SG* label. Apply mixes according to the most restrictive use limitations for either product:**

Herbicides: *Axial, Everest 2.0, Traxos, Simplicity, Varro, WildCat, Puma Advance.*

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Reward

Herbicide Group
22 - diquat
(Refer to page 45)

Company:

Syngenta Canada, distributed by Univar Environmental (PCP#26271)

Formulation:

240 g/L diquat formulated as a solution.

Container sizes: 4 x 3.78L.

Use:

For use in farm dugouts and other clear, slow moving water bodies to control water weeds, such as:

Canada water weed
Coontail
Duckweed
Flowering Rush
Pond weeds
Water milfoil

Offers temporary control of certain species of algae.

High levels of suspended organic matter or clay particles in water will reduce control.

NOTE: A permit must be obtained from Saskatchewan Environment or Manitoba Conservation and Water Stewardship for application of pesticides directly to or within a set distance of water bodies that are not wholly contained within a private parcel of land.

Timing:

Mid-May through late June when water weeds or algae are actively growing. Apply before weeds have developed a heavy mat of growth for effective control.

Rates:

Dugouts less than 5 feet (1.5 m) deep: Apply *Reward* at 7.4 L per acre.

At this rate, 2.2 L of *Reward* will treat a dugout that is 160 feet by 80 feet (49 m x 24.4 m).

Dugouts more than 5 feet (1.5 m) deep: Apply *Reward* at 10.1 to 11.8 L per acre.

At these rates, a dugout that is 160 feet by 80 feet (49 m x 24.4 m) will require 3.0 to 3.5 L of Reward.

Milfoil can be controlled in early stages by 3.7 L per acre in early stages of growth.

Application:

Dilute 1 part *Reward* with 4 parts clean water.
Spray over the water surface, inject below the water surface or pour directly onto the water surface from a moving boat or for small water bodies, apply from the banks. See label for detailed instructions. Note: *Reward* is bound rapidly to soil, so material must enter the water directly to be effective.

How it Works:

Refer to Table 2 on page 47.

Restrictions:

Grazing: DO NOT use water for animal consumption for 24 hours after application.

Irrigation: DO NOT use water for irrigation for 5 days after application.

Domestic Use: DO NOT use water for human consumption for 5 days after application. DO NOT swim in water for 24 hours after treatment.

Storage: DO NOT freeze.

Environment: If weed growth is dense, protect fish by not treating more than one-fourth of dugout at a time.

Equipment Clean Out:

Refer to page 'Method C' in the general section on sprayer cleaning on 15.

Hazard Rating:

◈ Warning – Poison

▽ Caution – Skin Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Salute

Herbicide Group
2 – imazamox, imazapyr
4 - clopyralid
(Refer to page 45)

This product is the equivalent of a prepackaged tank mix of *Ares* (page 93) and *Lontrel Dry* (Note: *Lontrel Dry* is only available with *Salute* and *Tensile* – See *Lontrel 360* on page 234). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Dow AgroSciences

Formulation

The *Salute* package contains the following components:

***Salute A* (PCP#31353):** 72% clopyralid formulated as a water soluble granule.
Container size – 2.25 kg.

***Salute B* (PCP#31354):** 35 g/L imazamox and 15 g/L imazapyr formulated as solution.
Container size – 1 x 9.8 L jug.

***Merge* adjuvant (PCP#24702):**
Container size - 8.1 L

Crops and Staging:

CLEARFIELD canola from the 2 to 6 leaf stage.

Weeds and Staging:

Weeds controlled by *Ares* plus:
Top growth control of:
Annual sow thistle
Perennial sow thistle
Canada thistle

Rates

Salute A: 56 g per acre.

Salute B: 245 mL per acre.

***Merge* adjuvant (purchased separately):** 0.5 L per 100 L of spray solution.
(One package treats 40 acres)

Minimum one application of *Salute* or other products that contain imazamox (*Ares, Solo, Odyssey*) per year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14

Tank Mixes:

None registered.

Restrictions:

Re-cropping: The year following *Salute* application fields can be seeded to canary seed, field peas*, field corn, CLEARFIELD canola/oilseed *B. juncea*, spring wheat, spring barley, tame oats. Two years following *Salute* application fields can be seeded to canola (all types), flax, sunflower, durum wheat, lentils, chick pea

** DO NOT seed to field peas for at least 10 months following treatment. Very dry soil conditions following application can result in a risk of injury to field peas grown in rotation. If severe drought conditions are experienced during the months of June to August inclusive in the year of application (22 months following application), contact your local Dow AgroSciences representative or retailer for more information before seeding field peas following drought conditions in the previous year.*

See component products for more information on restrictions application details and handling. Unless indicated differently above use the most limiting restrictions across all components for the mix.

Signal FSU

Herbicide Group

1 - clodinafop
2 - thifensulfuron/tribenuron
4 - fluroxypyr
(Refer to page 45)

Company:

Nufarm Agriculture

Formulation:

The *Signal FSU* package contains three components:

Signal F **(PCP#31434):** 112 g ai/L clodinafop propargyl and 217 g ae/L fluroxypyr ester formulated as an emulsifiable concentrate.
Container size – 8 L.

Boost **(PCP#30377):** 50% thifensulfuron methyl and 25% tribenuron methyl formulated as a water dispersible granule.
Container size – 320 g

Enhance Adjuvant **(PCP#29952)**
Container size – 4 L.

Crops and Staging:

Wheat (spring, durum) only: 2 leaf up to the emergence of the 4th tiller.

Weeds and Staging:

Grass weeds:

WEED	STAGE
Barnyard grass	1 to 5 leaf prior to tillering
Green and yellow foxtail	1 to 5 leaf stage, prior to emergence of 3rd tiller
Volunteer canaryseed, wild oats	1 to 6 leaf, maximum 3 tillers
Volunteer oats	3 to 6 leaf, maximum 3 tillers

Broadleave weeds:
Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Annual smartweed (green, lady's thumb)
Ball mustard
Chickweed (1 to 6 leaf)
Cleavers (1 to 4 whorls)
Common groundsel
Corn spurry
Cow cockle
Flixweed
Hemp nettle
Kochia (2 to 8 leaf)
Lamb's-quarters
Narrow leaved hawk's beard
Redroot pigweed
Russian thistle
Shepherd's purse
Stinkweed
Tartary buckwheat
Volunteer canola (not CLEARFIELD varieties)
Volunteer flax (up to 12 cm)
Volunteer sunflower
Wild buckwheat (1 to 3 leaf)
Wild mustard

Weeds Suppressed:
Canada thistle, sow thistle (less than 6 inches (15 cm) tall or across and prior to budding)
Round leaved mallow (2 to 6 leaf)
Scentless chamomile
Stork's bill (2 to 6 leaf)

Rate:

Signal F: 0.2 L per acre
Boost: 8 g per acre
Enhance Adjuvant: 0.25 L per 100 L of total spray solution.
(Once package treats 40 acres)

Maximum one application per year of *Signal FSU* or other products containing clodinafop, thifensulfuron, tribenuron, or fluroxypyr.

Thifensulfuron/tribenuron may degrade if left in the sprayer for an extended period. ***Apply within 24 hours of mixing.***

Refer to the product label for complete mixing instructions.

Application Information:

Water Volume: Minimum 40 L per acre.

Nozzles and Pressure: Use 29 to 40 psi (200 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage. Use of 50 mesh screens or coarser are required. Keep booms lower than 60 cm from crop canopy.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Application to crops stressed by extreme weather conditions such as frost, hail, saturated soils or drought as well as low fertility, insect damage or disease pressure may result in crop injury and / or reduce weed control.

Crop and weeds that are growing rapidly produce optimum activity. The optimum temperature range for the best activity is between 12 to 24 degrees C. Activity will be reduced below 8 degrees C and above 27 degrees C.

Tank Mixes:

Herbicides:

In wheat (spring and durum) only:

2,4 D Ester (up to 226 g ae per acre)

MCPA Ester (up to 452 mL of a 500 g / L form or 377 mL of a 600 g / L form per acre)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *Signal F* and *Boost* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 4 hours will reduce control.

Re-Entry Interval: DO NOT enter treated fields for 12 hours.

Pre-harvest Interval: Leave 60 days between application and harvest.

Grazing: DO NOT graze or feed treated crop to livestock within 3 days of application.

Recropping: Barley, canola, field peas, flax, forage grasses, lentils, mustard, oats, rye and registered crops may be seeded the season after application.

Aerial Application: DO NOT apply by aircraft.

Storage: Store in a cool, dry place in original container. Shake well before using. If frozen, warm liquid component gradually to 10 degrees C and shake well to reconstitute component before use.

Buffer Zones:

Crop	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only	15	15

See the key to product pages on page 27 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy..

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Tank Cleaning:

Thifensulfuron/tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray *Thifensulfuron/tribenuron* should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. The addition of detergent will enhance cleanout.

Hazard Rating:

Signal F:

Danger – Skin irritant

Caution Eye irritant

Boost:

Warning – Skin and Eye Irritant

Enhance Adjuvant:

Caution – Skin irritant

Warning, contains the allergen soy

For an explanation of the symbols used here see page 11.

Simazine

Herbicide Group
5 - simazine
(Refer to page 45)

Company:

Syngenta Canada distributed by Univar Environmental (*Princep Nine-T* - PCP#16370)

Loveland Products Canada (*Simazine 480* - PCP#23181)

Formulations:

Princep Nine-T: 90% simazine formulated as a water dispersible granular. Container sizes: 5 kg.

Simazine 480: 480 g/L simazine formulated as a solution. Container sizes: 2 x 10L.

Crops and Staging:

Established alfalfa or bird's-foot trefoil (*Princep Nine-T* only):

DO NOT use in year of seeding. Apply after final cut in fall until freeze-up. DO NOT apply to the same field more than three consecutive years. Residues may build up with yearly applications.

Corn (Field and Sweet): Apply one week prior to seeding and incorporate to a depth of 1 inch (2.5 cm), OR apply no later than 4 days after seeding corn. Rainfall is required to activate herbicide.

Established shelterbelts (elm (American, Siberian), caragana, green ash, Manitoba (boxelder) maple): Apply in fall or early spring before weeds begin growth. Injury may occur to shelter belts growing under saline conditions.

DO NOT apply to frozen ground

Weeds and Staging:

Simazine is applied prior to the emergence of the weeds and kills them when they are exposed to the treated layer of soil.

- Barnyard grass
- Lamb's-quarters
- Perennial species starting from seed
- Purslane
- Ragweed
- Smartweed (including lady's-thumb)
- Volunteer clovers
- Wild buckwheat
- Wild oats
- Yellow foxtail

Rates:

Forage crops:
Princep Nine-T: 0.45 kg per acre.

Corn:*
Princep Nine-T: 0.61 to 0.81 kg per acre.

Simazine 480: 1.4 to 3.4 L per acre.

Shelterbelts:
Princep Nine-T: 1.8 kg per acre.

Simazine 480: 3.8 to 5.7 L per acre.

* Rate of application to corn is dependent on soil texture. Refer to specific labels for correct application rates on corn.

Application Information:

Water Volume: Minimum 121 L per acre. In shelterbelts, use a minimum of 202 L per acre.

Pressure and Nozzles: For conventional flat fan nozzles use a maximum pressure of 30 to 45 psi (200 to 300 kPa). Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

Use 50 mesh or coarser nozzle screens and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

When applying to forage stands, dry soil conditions at the time of weed emergence may result in reduced weed control.

Tank Mixes:

None registered.

Note: The above mixes are those listed on the simazine labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Moderate rainfall after application enhances activity.

Re-Entry: DO NOT re-enter treated areas for 12 hours.

Grazing: In forage stands, allow 30 days between application and grazing, 60 days between application and cutting for feed. DO NOT graze or cut corn for feed prior to ear emergence.

Re-cropping: *Simazine* is persistent and residues may persist for several years depending on soil pH, available soil moisture, number of yearly applications, and the sensitivity of the following crop. *Simazine* will break down in soil more slowly under conditions of high pH and/or low rainfall. Corn will tolerate soil residues of *simazine* and may be planted the year of application. White beans, onions, peas may be injured 12 month after application.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze *Simazine 480*. *Princep Nine T* may be frozen. Store in a cool, dry place.

Buffer Zones:

Crops	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Alfalfa	1	1	4
Bird's-foot trefoil, sweet corn	1	1	5
Field corn	1	1	10
Shelter-belts	2	1	20

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. Based on products with similar chemistry, 'Method B' found in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide adequate cleaning. Contact the manufacturer for more information.

Hazard Rating:

☠ Caution - Poison. *(Simazine 480)*

For an explanation of the symbols used here see page 11.

Simplicity

Herbicide Group
2 - pyroxsulam
(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

Simplicity 30 OD **(PCP#28887):** 30 g / L pyroxsulam formulated as an oil dispersion.
Container size - 2 x 8 L

Simplicity GoDRI **(PCP#31916):** 21.5% pyroxsulam formulated as a water dispersible granule.
Container size - 4 x 2.24 kg.

Crops and Staging:

Wheat (Spring, and durum): 3 leaf stage until prior to the emergence of the flag leaf (up to 6 leaf plus 2 tillers).

Winter wheat: 1 to 3 leaf stage in fall or 2 to 7 leaf plus 4 tillers in spring.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds, Rates and Staging:

Wild oats (less than 75 plants per sqm):
Simplicity 30 OD at 0.15 L per acre (one case treats 106 acres) or *Simplicity GoDRI* at 21 g per acre (one 2.24 kg jug treats 106 acres).
All weeds listed below: *Simplicity 30 OD* at 0.20 L per acre (one case treats 80 acres) or *Simplicity GoDRI* at 28 g per acre (one 2.24 kg jug treats 80 acres)
Shake *Simplicty 30 OD* jug well before adding to spray tank.

Grasses:

WEED	STAGE
Wild oat	up to the 4 leaf, 2 tillers
Barnyard grass, **Yellow foxtail** **Green foxtail***	1 to 5 leaf
Japanese brome	1 to 6 leaf
Downy brome†	

Broadleaves:

Canada thistle* **(up to 30 cm, before budding**
Cleavers (up to 6 whorl)
Cow cockle (up to 8 leaf)
Common chickweed (up to 10 cm)
Corn spurry (up to 2 whorl or 10 cm tall)
Dandelion* **(spring rosettes <20 cm diameter)***
Flixweed (up to 10 cm)
Hemp-nettle (1-8 leaf)
Redroot pigweed (1-8 leaf)
Round-leaved mallow (up to 6 leaf or 10 cm)
Russian thistle* **(up to 10 cm)**
Shepherd's-purse (up to 30 cm)
Smartweed (1-5 leaf)
Stinkweed (up to 30 cm)
Volunteer canola (1-6 leaf)**
Wild buckwheat (1-4 leaf) *

* **Suppression only.**
** Not Clearfield varieties
† Control with fall application in winter wheat; suppression only in spring applications on both winter and spring wheat.

When applied alone, *Simplicity* must be applied using a non-ionic surfactants (*Agral 90, AgSurf II*) at 0.25 L per 100 L.

Winter wheat (Simplicity alone) use one of the following adjuvants:
Assist at 0.8 L per 100 L of spray
Merge at 0.5 L per 100 L of spray (spring application only)
* Adjuvants purchased separately.

Application Information:

Water Volume:
Ground: 20 to 40 L per acre.
Aerial: 12 L per acre
Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets. See the label for detailed instructions on aerial application.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury may result and / or weed control may be reduced.

Tank Mixes:

Herbicides:

The addition of an adjuvant is not required in tank mixes unless the adjuvant is required by the tank mix partner.

TANK-MIX PARTNER	PRODUCT RATES
2,4-D Ester	280 g ae per acre
Buctril M	0.4 L per acre
Curtail M	0.6 L per acre
Frontline 2,4-D (florasulam + 2,4-D)	60 acres per case
Frontline XL (florasulam + MCPA)	0.5 L per acre
MCPA ester (600 formulation)	0.23 to 0.38 L per acre
*OcTTain XL***	0.45 L per acre
Prestige XC	27 acres per case
Spectrum (florasulam + Curtail M)	20 acre per case
*Stellar***	label rates
Thumper	0.4 L per acre

Fungicides:

*Tilt** (label rates)

*Stratego**(label rates)

*MCPA + Tilt**

*MCPA + Stratego**

Fertilizers: None registered

* High rate of *Simplicity* only.

** *Simplicity GoDRI* only.

Note: The above mixes are those listed on the *Simplicity* label only.

Dow AgroSciences also supports the following mixes that are not on the *Simplicity* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *2,4 D ester* (up to 420 g ae/acre), *Attain XC* (low use rate), *Attain XC* + either *Tilt* or *Stratego, Barricade, Bromoxynil, Paradigm, Pixxaro, Retain, Thifensulfuron/tribenuron.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 2 hours may reduce control.

Preharvest: Leave 60 days between treatment and harvest.

Grazing: Must NOT be grazed or fed to livestock for 7 days after treating crop.

Recropping: Barley, condiment and oilseed quality brown mustard (*B. juncea* types), canola, chickpea, dry bean, flax, lentil, oat, field pea, potato, spring wheat, soybean, sunflower and yellow mustard may be seeded 11 months following treatment.

Aerial Application: May be applied by air.

Storage: Avoid freezing, store above -9°C. Allow product to warm above 7°C before using and thoroughly mix the product prior to use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground*	1	1	2
Helicopter	1	1	60
Fixed wing aircraft	1	1	70

See page 36 for an explanation of the different habitats.

* **These distances can be reduced by 30% using cones** on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Equipment used to apply *Simplicity* should not be used to apply other pesticides to sensitive crops without thorough cleaning. **To avoid subsequent injury to crops other than cereals, all spraying equipment must be thoroughly** cleaned both inside and out, as follows:

1. Immediately after spraying drain the sprayer tank. Any **contamination on the outside of the spraying equipment** should be removed by washing with clean water.
2. Rinse inside of tank with clean water and flush through booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.
3. Add *All Clear* **tank cleaner at** 0.5 L **per** 100 L **of water** while filling the tank ½ full with clean water. Agitate for at least 15 minutes ensuring the cleaning solution comes in contact with interior surfaces. Flush the boom and hoses with the cleaning solution and be sure to remove caps at the end of booms to allow cleaning solution to reach **all areas of the boom. Leave the spray solution in the** sprayer for an extended period if possible (eg. overnight). Thoroughly drain the sprayer.
4. Remove nozzles and screens and clean separately with *All Clear* **cleaning solution (50 mL in 10 L water).**
5. Rinse the tank with clean water and flush through the booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.

Refer to page 15 to 16 for additional information on sprayer cleaning.

Hazard Rating:

Warning - Poison

Warning - Contains the allergen soy

Caution – Eye and Skin Irritant, Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Solo

Herbicide Group
2 - imazamox
(Refer to page 45)

Company:

BASF Canada

All crops listed under 'Crops And Staging:' below (PCP#25496)

CLEARFIELD canola only (PCP#28741)

Formulation:

70% imazamox as a water dispersible granule.

Container size - 4 x 117 g water soluble bags.

Crops and Staging:

CLEARFIELD sunflower: 2 to 8 leaf stage.

CLEARFIELD canola: 2 to 6 leaf stage.

CLEARFIELD lentil: 2 to 6 leaf stage.

CLEARFIELD oilseed mustard (*Brassica juncea*): 2 to 6 leaf stage

Temporary crop yellowing may be observed shortly after application in CLEARFIELD canola.

Weeds and Staging:

Grasses - 1 to 4 main stem leaves, early until tillering.

Barnyard grass
Green foxtail
Japanese brome*
Persian darnel
Volunteer barley
Volunteer canaryseed
Volunteer oat
Volunteer wheat (not CLEARFIELD varieties)
Wild oat
Yellow foxtail

Broadleaf Weeds - cotyledon to 4 leaf stage.

Cleavers*
Cow cockle
Green smartweed
Lamb's-quarters
Redroot pigweed
Shepherd's-purse
Stinkweed
Volunteer canola (not CLEARFIELD varieties)
Wild buckwheat*
Wild mustard

* Suppression only.

Rates:

Solo: 11.7 g per acre (40 acres per case)

***Merge* adjuvant (sold separately):** Must be used with *Solo* at a rate of 0.5 L of *Merge* per 100 L of total mixed spray solution.

DO NOT apply *Solo* more than once or follow *Solo* with any other products containing imazamox in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 40 L per acre.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage and a minimum of fine droplets that are prone to drift. Use 50 mesh or coarser filter screens.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C are forecast within 3 days of application. Treat crops during warm weather when weeds are actively growing and soil moisture is adequate for rapid growth. Under cool or dry conditions, control of some weeds may be severely reduced.

Tank Mixes:

None registered.

Restrictions:

Rainfall: DO NOT spray if there is a forecast of rain during or soon after application as it may reduce control.

Re-Entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze treated canola or lentil or cut for feed within 20 days of application.

DO NOT graze treated sunflower or cut for straw.

Preharvest Interval: DO NOT apply to canola or lentil within 60 days of harvest.
DO NOT apply to sunflower within 70 days of harvest.

Re-cropping: Winter wheat may be seeded 3 months after application. Barley, canaryseed, canola, chickpea, field corn, field pea, flax, lentil, oat, sunflower, and spring wheat (including durum) may be seeded the first spring after application and tame mustard (condiment types only) the second season after application. The company recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above.

Contact manufacturer for additional information on recropping intervals (1-877-371-2273).

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Store in a cool, dry place above 5° C.

Buffer Zones: Avoid spraying in situations where drift may occur. **Leave at least 11 m between the outside edge of the** sprayed area and sensitive non-target areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs.

Sprayer Cleaning:

Refer to 'Method C' in the general sprayer cleaning section on page 15.

Hazard Rating:

⚠ Warning – **Eye and Skin Irritant.**
May cause eye damage.

For an explanation of the symbols used here see page 11.

Spectrum (this referring text to be removed in the 2018 edition)

See florasulam + Curtail M on page 171.

Stellar (this referring text to be removed in the 2018 edition)

See florasulam/fluroxypyr + MCPA Ester on page 175.

Tandem

Herbicide Group
2 - pyrosulam
4 - fluroxypyr
(Refer to page 45)

Company:

Dow AgroSciences

Formulation:

The *Tandem* package has 2 components:

***Tandem A* (PCP#29985):** 30 g/L pyroxsulam formulated as an oil dispersion.

Container size - 8 L jug.

***Tandem B* (PCP#29965):** 333 g ae/L fluroxypyr formulated as an emulsifiable concentrate.

Container size - 4.84 L

Crops and Staging:

Spring wheat (including durum): 3 leaf stage until the first node can be felt in the stem (up to 6 leaf plus 2 tillers).

When tank-mixing always check the tank mix partner recommendations for additional staging restrictions.

Winter wheat: Apply in the spring from the 3 tiller stage to just before the flag leaf stage.

Weeds, Rates and Staging:

***Tandem A* at 0.15 L per acre plus *Tandem B* at 85 mL per acre (53 acres per case):**
Cleavers (up to 6 whorls)
Wild oats (less than 75 plants per sqm)

***Tandem A* at 0.20 L per acre plus *Tandem B* at 127 mL per acre (40 acres per case):**

Grasses:

WEED	STAGE
Wild oat	up to the 4 leaf, 2 tillers
Barnyard grass, Yellow foxtail Green foxtail*	1 to 5 leaf
Japanese brome	1 to 6 leaf
Downy brome*	2 to 6 leaf, 4 tillers

Broadleaves:

WEED	MAXIMUM APPLICATION STAGE
Wild buckwheat*	4 leaves
Smartweed	5 leaves
Round-leaved mallow, Volunteer canola**	6 leaves
Cleavers, Cow cockle, Hemp-nettle†, Kochia, Redroot pigweed, Stork's-bill*	8 leaves or whorls
Common chickweed, Flixweed, Russian thistle*	10 cm
Volunteer flax	12 cm
Dandelion*	up to 20 cm, diameter
Canada thistle*	up to 30 cm, prebud

* Suppression only.

** Not Clearfield varieties

† NOTE Group 2 resistant biotypes only controlled to the 6 leaf stage.

Application Information:

Water Volume:

Ground: 20 to 40 L per acre.

Aerial: 20 L per acre.

Nozzles and Pressure: Use 29 to 40 psi (200 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE coarse*** droplets. Low drift nozzles may require higher pressures for proper performance. See the label for detailed instructions on aerial application.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

The temperature range for optimum activity is 12°C to 24°C. Reduced activity will occur when temperatures are below 8°C or above 27°C. Frost before application (3 days) or shortly after (3 days) may reduce weed control and crop tolerance. Weed control may be reduced during stress conditions, (e.g. drought, heat or cold stress, or if weeds have initiated flowering), or if heavy infestations exist.

Tank Mixes:

Herbicides:
In spring wheat (including durum):
2,4-D Ester 700 (0.24 to 0.32 L / acre)
Curtail M (0.61 to 0.81 L / acre)
MCPA Ester (0.24 to 0.38 L / acre) (600 g ae / L forms)

Fungicides:
Tilt, *Stratego*

Note: The above mixes are those listed on the *Tandem* label only.

Adding ingredients in the correct order is critical for optimum performance.

Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 2 hours may reduce control.

Re-entry: DO NOT re-enter treated fields for 12 hours.

Preharvest Interval: Leave 60 days from treatment to harvest.

Grazing: Must NOT be grazed or fed to livestock for 7 days after treating crop.

Recropping: Barley, canola, flax, lentil, mustard, oat, field pea, spring wheat may be seeded 11 months following treatment or fields may be fallowed.

Aerial Application: May be applied by air.

Storage: Avoid freezing, store above -9°C. Allow product to warm above 7°C before using and thoroughly mix the product prior to use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	2
Helicopter	1	1	55
Fixed wing aircraft	1	1	65

See page 36 for an explanation of the different habitats.

* **These distances can be reduced by 30% using cones on** individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Equipment used to apply *Tandem* should not be used to apply other pesticides to sensitive crops without thorough cleaning.

Refer to 'Method A' on page 15 to 16 for additional information on sprayer cleaning.

All Clear **tank cleaner at** 0.5 **L per** 100 **L of water or** *Clean-Out* **tank cleaner at** 0.25 **L per** 100 **liters of water may be used in** place of ammonia in the sprayer clean-out process.

Hazard Rating:

Tandem A:

Warning - Poison.

Warning - Contains the allergens soy.

Caution – Eye and Skin Irritant,
Potential Skin Sensitizer

Tandem B:

Danger - Poison.

Warning - Eye and Skin Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Tensile

Herbicide Group
2 - imazamox
4 - clopyralid
(Refer to page 45)

This product is a prepackaged tank mix of *Solo* (page 296) and *Lontrel Dry* (*Lontrel Dry* is only available with *Salute* and *Tensile*) (page 234). Information listed is restricted to Crop, Weeds and Rates. For other detailed information on the effect of growing conditions, and restrictions for the component products see the product pages listed above.

Company:

BASF Canada

Formulation:

The *Tensile* package contains 2 components:
***Solo* (PCP#28741):** 70% imazamox formulated as a dispersible granule.
Container size - 4 x 117 g water soluble bags.
***Lontrel Dry* (PCP#27306):** 75% clopyralid formulated as a dispersible granule.
Container size - 2 x 810 g.

Crops and Staging:

CLEARFIELD canola varieties: 2 to 6 leaf stage.
Apply **only** to CLEARFIELD canola varieties; application to any other variety of canola or any other crop will result in crop death.

Weeds and Staging:

Weeds controlled by *Solo* plus:

Canada thistle (rosette to pre-bud stage)*
Sow-thistle, annual
Sow-thistle, perennial*
Wild buckwheat

* Top growth control for 6 to 8 weeks

Rates:

Solo: 11.7 g per acre.

Lontrel Dry: 40 g per acre.
(One case treats 40 acres)

Merge: 0.5 L per 100 L of spray solution (sold separately). At a spray volume of 40 L per acre one 8.1 L jug of *Merge* will treat 40 acres. *Tensile* MUST be applied with *Merge* adjuvant.

DO NOT apply *Tensile* more than once or follow *Tensile* with any other products containing clopyralid or imazamox in the same year.

Refer to the product label for complete mixing instructions for this product and its mixes. A general guide to mixing can be found on page 14.

Restrictions and Application Information:

See component products for additional information including restrictions. Use the most limiting restrictions across all components for the mix. Particular attention should be paid to the recropping restrictions for both *Solo* and *Lontrel*.

Thifensulfuron/tribenuron

Herbicide Group
2 - thifensulfuron & tribenuron
(Refer to page 45)

Company:

E. I. duPont Canada (*Refine SG*)
Arysta LifeSciences (*Deploy WDG*)
FMC of Canada (*Nimble*)
Farmers of North America (*MPower R*)

Formulation:

Refine SG **(PCP#28285):** 33.35% thifensulfuron methyl plus 16.65% tribenuron methyl formulated as a water soluble granule.
Container size – 486 g.

Deploy WDG **(PCP#30846);** ***MPower R*** **(PCP#30945);** ***Nimble*** **(PCP#29467) = 75%WDG formulations**: 50% thifensulfuron methyl plus 25% tribenuron methyl formulated as a water dispersible granule.
Container size – 320 g.

Crops and Staging:

Apply from 2 leaf to the flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

Cereals:

Barley
Oat
Wheat (including durum spring and winter)

Seedling or established forage grasses for forage or seed production:*

Bromegrass (meadow, smooth)
Fescue (creeping red, tall)
Kentucky bluegrass**
Orchardgrass
Wheatgrass (crested, intermediate, northern, pubescent, slender, streambank, tall, western)

* ***NOTE:*** *Since the use of this product on forage grasses is registered under the User Requested Minor Use registration system, the manufacturer assumes no responsibility for herbicide performance.* ***Users of this product on forage grass do so at their own risk.***

** Established stands only.

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Weeds Controlled:

Annual smartweed (green, lady's thumb)
Ball mustard
Chickweed (1 to 6 leaf)
Common groundsel
Corn spurry
Cow cockle
Flixweed
Hemp-nettle
Lamb's-quarters
Narrow leaved hawk's beard
Redroot pigweed
Russian thistle
Shepherd's-purse
Stinkweed
Tartary buckwheat
Volunteer canola
(**CLEARFIELD varieties** controlled with 2,4-D or MCPA mixes only)
Volunteer sunflower
Wild buckwheat*
Wild mustard

* *Refine SG:* up to 5 leaf stage; 75%WDG formulations: up to 3 leaf stage only.

Weeds Suppressed:

Canada thistle, sow-thistle (less than 6 inches (15 cm) tall or across and prior to budding)
Cleavers (1 to 3 whorls)
Round-leaved mallow (2 to 6 leaf)
Scentless chamomile
Stork's-bill (2 to 6 leaves)
Toadflax (less than 6 inches or 15 cm tall)

Rate:

Refine SG: 12 g per acre (one 486 g container treats 40 acres).

75%WDG formulations: 8 g per acre (one 320 g container treats 40 acres).

Maximum of one application of *Thifensulfuron/tribenuron* or other products with the same ingredients per year.

Add *Agral 90, Agsurf,* or *Citowett Plus* **surfactants at 0.2 L per 100 L of spray solution.**

75%WDG formulations may also use *Liberate* and *Nufarm Enhance* **surfactants at 0.2 L per 100 L of spray solution.**

Thifensulfuron/tribenuron may degrade if left in the sprayer for an extended period. ***Apply within 24 hours of mixing.*** Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume:

Ground: **Minimum 22 L per acre.**

Aerial (Refine SG only): **Minimum 10 L to maximum 20 L** per acre.

Nozzles and Pressure: **Use 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use** a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. **Use a 50 mesh or coarser screen and filter system.**

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to wheat, barley or oats that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result.

Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

Tank Mixes:

Herbicides:

Tank mix partners applied at all label rates. Recommended adjuvants are used unless otherwise noted.

Tank Mix Partner	**CROPS**				
	Spring wheat	**Winter wheat**	**Durum**	**Barley**	**Oats**
2,4-D amine or ester (160 to 212 g ae/acre)*†	✓	✓	✓	✓	
Clodinafop 240EC (95 to 115 mL/acre) plus *Score* adjuvant	✓		✓		
Clodinafop 240EC (95 mL/acre) + *Dicamba* (*Banvel II* rates below) plus *Score* adjuvant	✓		✓Δ		
Clodinafop 240EC (95 mL/acre) + *MCPA* ester (0.23◊ or 0.34 to 0.45 L/acre)* plus *Score* adjuvant	✓		✓		
Curtail M (0.61 L/acre) †	✓			✓	
Dicamba (Banvel II only at 44.5 mL/acre to 58.7 mL/acre**)†	✓		✓Δ	✓	
Fenoxaprop 120EC (0.16 to 0.31 L/acre)	✓		✓	✓	
Fenoxaprop 120EC (0.16 to 0. 31 L/acre) + *MCPA* ester (0.23◊ or 0.34 L/acre)*	✓		✓	✓	
Fluroxypyr + 2,4-D (Flurox 2,4 only)†	✓ΔΔ		✓ΔΔ	✓ΔΔ	
Imazamethabenz (Assert only)	✓		✓	✓	
Imazamethabenz (Assert only) + *MCPA* ester (0.28 to 0.45 L/acre)*	✓		✓	✓	
Lontrel 360 (85 mL/acre) †	✓			✓	
Lontrel 360 (85 mL/acre) + *2,4-D* ester* or *MCPA* ester* (0.34 L/acre) †	✓			✓	
MCPA amine or ester (0.23 ◊ or 0.28 to 0.45 L/acre)*	✓	✓	✓	✓	✓
Simplicity 30 OD (0.15 to 0.20 L/ acre) †	✓Δ		✓Δ		

† Marked tank mixes require the addition of a non-ionic surfactant. Unmarked mixes do not require additional adjuvant beyond what is provided for by the tank mix partner.

Δ *Refine SG* only.

ΔΔ *Deploy, MPower R* and *Nimble* only.

* 500 g ai/L formulation.

** High rate of *Banvel II* with *Refine SG* only.

◊ Tank mix with 0.23 L/acre to control *Clearfield* canola at the 2 to 4 leaf stage.

Check the above tank mix partner(s) respective labels for additional staging and varietal restrictions.

Fertilizers: None registered.

Note: The above mixes are those listed on the Thifensulfuron/tribenuron labels only.

E.I. duPont also supports the following mixes that are not on the *Refine SG* label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: *Attain XC, Axial BIA, Flucarbazone 2.0, Flucarbazone 2.0 + 2,4-D, Puma Advance, Simplicity, Traxos*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Rainfall of 1 inch (25 mm) or more beginning within 1 hour of application of *Refine SG* or 4 hours for 75% WDG formulations may reduce control.

Re-Entry: DO NOT re-enter treated fields for 12 hours.

Grazing: Must NOT be grazed or fed to livestock for 7 days after treatment.

Re-cropping: No restrictions the year after treatment. Canola, flax, lentil and alfalfa may be planted 2 months after application.

Aerial Application: *Refine SG* may be applied by air. **DO NOT apply 75% WDG formulations by air.**

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	15
Fixed wing airplane	1	0	125
Helicopter	1	0	100

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

75% WDG formulations *(Ground equipment only):*

Leave a 15 m buffer zone between last spray swath and sensitive upland or aquatic habitats such as shelterbelts, wetlands, sloughs, and woodlots.

Sprayer Cleaning:

Thifensulfuron/tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray *Thifensulfuron/tribenuron* should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. If mixing with another pesticide with different cleaning measures, those measures should be integrated into 'Method A' (e.g. addition of detergent).

Hazard Rating:

75% WDG formulations:

⚠ **Warning – Eye and Skin Irritant**

Refine SG:

⚠ Warning – Contains the allergen milk.

For an explanation of the symbols used here see page 11.

Thifensulfuron/tribenuron + MCPA ester

Herbicide Group
2 - thifensulfuron & tribenuron
4 - MCPA
(Refer to page 45)

These products are prepackaged tank mix of *Refine SG* (page 301) and *MCPA ester* (page 237). Information listed is restricted to Crop, Weeds and Rates and Tank mixes. For other detailed information on the component products see the product pages listed above.

Company:

E. I. duPont Canada (*Refine M*)
Loveland Products Canada (*BroadSide*)

Formulation:

***Refine SG* (PCP#28285):** 33.35% thifensulfuron methyl + 16.65% tribenuron methyl; formulated as a water soluble granule.
Container size - 8 x 121 g water soluble packets.

plus

***MCPA ester* (PCP#26161):** 500g / L MCPA formulated as an emulsifiable concentrate.
Container size - 2x 9.1 L of *MCPA ester*.

or

***MCPA ester* (PCP#27803):** 600g / L MCPA formulated as an emulsifiable concentrate.
Container size - 2x 7.6 L of *MCPA ester*.

Crops and Staging:

Barley, wheat (including durum and winter) and oat from full 3 leaf to the flag leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

Weeds and Staging:

Weeds Controlled or Suppressed by *Refine SG* plus 'Susceptible Weeds' controlled by MCPA ester, plus:

Dandelion (rosettes, less than 15 cm in diameter)
Volunteer canola (2 to 4 leaf) (including CLEARFIELD varieties)

Rate:

***Refine SG* :** 12 g per acre
***MCPA Ester*:** (500 g per L) - 0.23 L per acre, (600 g per L) - 0.19 L per acre
(One case treats 80 acres)

Refer to the product labels for complete mixing instructions. A general guide to mixing can be found on page 14.

Tank Mixes:

Herbicides:

In spring wheat (including durum) and barley:
Assert (0.54 to 0.67 L / acre)
In spring wheat (NOT durum) and barley:
Lontrel 360 (85 mL / acre)

Check the above tank mix partners respective labels for additional staging and varietal restrictions.

Note: The above mixes are those listed on the *Refine SG* label only.

E.I. duPont also supports the following mixes that are not on the Refine M label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Horizon NG, Puma Advance, Traxos*

See component products for more information on restrictions application details and handling. Use the most limiting restrictions of each component.

Topramezone

Herbicide Group
27 – topramezone
(Refer to page 45)

Company:

AmVac Corporation, distributed in Canada by UAP
(*Impact* - PCP#28141)
BASF Canada (*Armezon* - PCP#30131)

Formulation:

336 g/L topramezone formulated as a suspension.
Container size - 8 L
Armezon: 0.6 L.
Impact: 8 L.

Crops and Staging:

Corn (field[†], seed, sweet[††]): From the 1 to 7 leaf stage

[†] Including both conventional and herbicide tolerant varieties.

[††] *NOTE: Tolerance of sweet corn varieties to topramezone and its mix partners may be variable. When tolerance is unknown, check with the supplier of seed and/or apply to a small area first to assess tolerance.*

Weeds and Staging:

The following weeds are controlled with *topramezone* unless otherwise indicated:

Topramezone MUST BE applied in tank mix with one of the herbicide options indicated in '*Tank Mixes*'.

Grass weeds below from the 1 to 4 leaf stage:

Barnyard grass*
Foxtail (green and yellow)*

Broadleaf weeds below from the 1 to 8 leaf stage:

Chickweed (common)*
Kochia (up to 10 cm)**
Lamb's-quarters*
Lady's-thumb*
Nightshade (eastern black)
Pigweed (redroot, green)
Ragweed (common)
Velvetleaf*
Volunteer canola (up to 6 leaf)**
Wild mustard

* Suppression only.
** Armezon only. All types including glyphosate-resistant varieties.

Rates:

15 mL per acre

Must be applied with either:

Merge adjuvant at 0.5 L per 100 L of spray solution

-or-

Assist (or *XA Oil concentrate**) at 1.25 L per 100 L plus UAN (liquid 28-0-0) at 1.25 L per 100 L of spray solution.

Maximum one application of *topramezone* per season.

Application Information:

Water Volume: Minimum 81 L per acre.

Nozzles and Pressure: Use 20 to 40 psi (140-276 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE medium*** droplets while maintaining good coverage of foliage.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

When weeds are stressed because of drought, flooding, hot or cool temperatures, weeds are not actively growing, control may be reduced.

Tank Mixes:

Herbicides:

Topramezone must be mixed with one of the following:

Field and Sweet Corn:

AAtrex (0.42 L/acre) (DO NOT use *Merge* with this mix in sweet corn)

Field corn only:

Frontier Max (0.3 L/acre) + *AAtrex* (rates above)

Glyphosate tolerant corn only:

Glyphosate (360 g ae per acre, no adjuvant required) (see glyphosate page for details)
Glyphosate + *AAtrex* (rates above)
Glyphosate + *AAtrex* (rates above) + *Frontier Max* (rates above)

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the topramezone label only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: DO NOT apply if heavy rain is forecast. Contact manufacturer for more information.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated fields or cut for feed within 45 days of application.

Pre-harvest Interval: Leave 45 days between application and harvest.

Re-cropping: Field corn only may be seeded to treated areas after a crop failure. Winter wheat may be seeded a minimum four months after application. Spring wheat, field corn, navy (white) bean, soybean, pea and alfalfa may be seeded the following crop year. Check tank mix options for additional reseeding restrictions. Conduct a field bioassay (a test strip grown to maturity) the year before growing any other crop.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool (above 5°C), dry area. If product is frozen, bring to room temperature and agitate before use.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on pages 15 to 16.

Hazard Rating:

⚠ Warning – Contains the allergen soy.

For an explanation of the symbols used here see page 11.

Tordon 22K

Herbicide Group

4 - picloram

(Refer to page 45)

Company:

Dow AgroSciences (PCP#9005)

Formulation:

240 g/L picloram acid present as a potassium salt, formulated as a solution.

Container size - 10 L, 3.6 L

Note: Available only through selected retail outlets.

Crop and Staging:

Apply at any stage of permanent grass pastures, rangeland and non cropland.

NOTE: It is strongly recommended that this product be applied by a licensed applicator.

Weeds, Rates and Staging:

For the control of biennial and deep rooted perennial weeds listed below:

Weed	Rate L/Acre	Backpack (mL of Tordon 22K per 100 M^2)[*]
Scentless chamomile	0.445	11
Knapweed (diffuse, spotted)	0.91	22
Canada thistle, pasture sage, poverty weed, Russian knapweed, perennial sow thistle	1.8	45
Leafy spurge, field bindweed, toadflax	3.6[†]	90[†]

[†] NOTE: This rate is only registered for use with hand application equipment (wand or backpack) and only one acre of every two may be treated in this manner at this rate.

[*] mix with 18 litres of water and the spray solution over 100 square metres.

For best results, applications should be made when perennial weeds have fully developed, green leaves. Application in late summer (or periods of dry weather) when plants are not actively growing may result in unsatisfactory control.

Application Information:

Water Volume: 160 to 325 L per acre without spray running off foliage.

Nozzles and Pressure: Maximum 150 to 350 kPa (20 to 50 psi) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of application equipment and pressure that is designed to deliver an even coverage of coarse droplets that are not prone to drift. Non-target broadleaf plants are very sensitive to *Tordon 22K* drift.

Avoid conditions that are conducive to drift. (See page 12 for drift control suggestions)

How it Works:

Tordon 22K interferes with cell division, causing leaf cupping, stem distortion and eventual death. *Tordon 22K* is absorbed through the leaves and roots.

IMPORTANT: *Tordon 22K* is a very persistent and water-soluble herbicide. Treated soil should NOT be moved from the treated area. DO NOT apply to soils that are permeable, have sinkholes, or lie over limestone bedrock. DO NOT apply to soils whose surfaces are composed of fractured rock or unconsolidated gravel. Application to these sites may allow the movement of herbicide to underlying water sources or aquifers. If shallow aquifers are present, DO NOT apply *Tordon 22K*. This product is moderately toxic to fish. DO NOT apply to any water bodies or in areas where the runoff from treated areas will reach fish-bearing waters.

Tordon 22K must not be applied on range and pasture acres that are irrigated. DO NOT compost or mulch clippings from grass treated with *Tordon 22K*.

Effects of Growing Conditions:

Avoid application when pasture and target weeds are under stress from drought, flooding, extreme heat or cold, as injury to grass or unacceptable control may result. Avoid spraying if temperatures exceed 28°C.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Rain within 6 hours of application may cause poor results. Heavy rainfall may dissolve and carry *Tordon 22K* away from the target area, or it may leach dissolved *Tordon 22K* out of the root zone or to undesirable locations.

Grazing: DO NOT graze lactating dairy animals within 6 weeks after treatment. There are no grazing restrictions for other livestock. DO NOT use manure from animals grazing treated forage to fertilize susceptible plants or crops.

Re-cropping: *Tordon 22K* may persist in the soil for up to 5 years. For this reason *Tordon 22K* may only be applied on permanent grass pastures and rangeland unless applied by an authorized pesticide applicator. Avoid the root zone of desirable trees or shrubs.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze.

Buffer Zones:
Hand-held or backpack sprayer and spot treatment DO NOT **require a buffer zone from sensitive habitat, but** efforts should be made to minimize exposure to sensitive plants and open water or wetlands.

Application method	Buffer Zones (metres†) Required for the Protection of:	
	Aquatic Habitats	Terrestrial habitat
Ground only	1	120

See page 36 for an explanation of the different habitats.

* **These distances can be reduced by** 30% **using cones** on individual nozzles and by 70% using a full shield (shroud, curtain) that extends to the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Tordon 22K can cause severe injury to sensitive crops (especially pulses and other broadleaf crops) at very low **concentrations. Spray equipment should be flushed out** immediately after spraying *Tordon 22K*. Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Caution - Poison.

Danger - **Eye Irritant.**

May Cause Skin Irritation.

For an explanation of the symbols used here see page 11.

Tralkoxydim

Herbicide Group
1 - tralkoxydim
(Refer to page 45)

Company:

Dow AgroSciences (*Liquid Achieve* - PCP#28555; *Turbocharge* adjuvant - PCP#28554 or *Intake* adjuvant - PCP#31243)

ADAMA Canada (*Bison* - PCP#29256; *Addit* adjuvant - PCP#29263)

Loveland Products Canada (*Marengo* - PCP#29289; *Turbocharge B* adjuvant - PCP#29288)

Nufarm Agriculture (*Nufarm Tralkoxydim* - PCP#30176; *Nufarm Tralkoxydim Adjuvant* - PCP#30175)

Formulation:

400 g / L tralkoxydim formulated as a suspension concentrate.

Container sizes -

***Marengo*:** 8 L of tralkoxydim plus 4L *Turbocharge*.

***Bison*:** 8 L of tralkoxydim plus 8 L *Addit* adjuvant

***Liquid Achieve*:** 8 L of tralkoxydim (*Turbocharge and Intake* adjuvants sold separately).

***Nufarm Tralkoxydim*:** 8 L of tralkoxydim plus 4 L *Nufarm Tralkoxydim Adjuvant*

Contact manufacturers.

Crops and Staging:

No staging restrictions unless otherwise indicated.

Cereals:

Barley
Rye (spring & fall)
Triticale
Wheat (spring, durum, & winter)

Forage legumes: May be used on wheat and barley crops undersown to the following (if not tank mixed with a broadleaf herbicide).

Alfalfa
Bird's-foot trefoil
Clovers
Sanfoin

Forage Grasses (seed production only)*:
Under-seeded with a cereal or grown alone (seedling or established)*:

Bromegrass (meadow, smooth)
Creeping red fescue
Wheatgrass (crested, intermediate)

Under-seeded with a cereal or grown alone (seedling only)*:

Wheatgrass (northern, slender, western)

** Liquid Achieve, Nufarm Tralkoxydim and Bison only. NOTE - Since applications to these crops have been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Applications to these crops is at the risk of the user.***

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions.

Weeds and Staging:

Wild oats - 1 to 6 leaf stage (total leaves including tillers), with a maximum of 2 tillers.

Volunteer tame oats - 1 to 6 leaf stage.

Green and yellow foxtail - 1 to 5 leaf stage (total leaves including tillers), with a maximum of 1 tiller.

Barnyard grass, Persian darnel - 1 to 4 leaf stage (total leaves including tillers).

For forage grasses and perennial cereal rye, apply prior to tillering of the above weeds.

Apply at the 2 to 3 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering.

Rates:

0.2 L per acre. One 8 L jug of *tralkoxydim* treats 40 acres.

Add *Turbocharge, Intake, Nufarm Tralkoxydim Adjuvant*, or *Addit* adjuvant at a rate of 0.5 L per 100 L spray solution. Under adverse conditions or heavy weed infestations add *Intake* adjuvant to *Liquid Achieve* at 1 L per 100 L of spray solution.

Maximum one application of these products or other products containing tralkoxydim per season.

Note: If water analysis shows bicarbonate levels are 400 ppm or greater, add 0.9 to 1.8 kg of active ammonium sulphate per 100 L of spray water prior to mixing.

Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14

Application Information:

Water Volume:

***Ground*:** 20 to 40 L per acre. Application in less than 20 L per acre water volume may result in mixing problems or unacceptable crop injury.

***Aerial*:** 12 to 18 L per acre.

Nozzles and Pressure:

Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. See the label for detailed instructions on aerial application.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Cereal crops that have set tillers may incur injury (yellowing and/or stunting) if applications are made within 48 hours of freezing temperatures. Cereal crops that have not set tillers may be injured if exposed to temperatures of 4°C or less up to 48 hours before or after application. Tank mixing with a broadleaf weed herbicide under adverse conditions may increase severity of crop injury. Crops under stress from foliar diseases or low fertility are more susceptible to injury from application. Temporary crop injury may occur when tralkoxydim tank mixes (particularly dichloprop/2,4-D ester products, and bromoxynil/MCPA ester products + additional *MCPA* Ester) are applied under extreme environmental conditions (dry or wet, cool or hot weather) resulting in crop stress. Control of grasses could be reduced when they are stressed due to drought, heat, lack of fertility, flooding or prolonged cool temperatures.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:

DO NOT tank mix tralkoxydim products with a broadleaf herbicide when applying to underseeded forage grasses or legumes.

	CROPS						
Tank Mix Partner	**Spring wheat**	**Durum**	**Winter wheat**	**Barley**	**Spring rye**	**Fall rye**	**Triticale**
2,4-D ester (205 g ae/acre)†	•	•	•	•	•	•	
Bromoxynil†	•	•	•***	•		•***	•***
Bromoxynil + 2,4-D (0.40 L/acre)†*	•	•		•			
Bromoxynil/MCPA Ester†*	•	•	•	•		•	
Curtail M (0.81 L/acre)	•	•		•			
*Dichlorprop/2,4-D**	•	•	•	•			
Fluroxypyr + 2,4-D (Attain XC and *OcTTain* only)†††	•	•	•	•			
Fluroxypyr + MCPA (Trophy only)	•	•		•			
Infinity††	•	•	•	•			
Lontrel (0.11 L/acre) + *MCPA ester* (0.38 L/acre - 600 g/L forms)	•	•		•			
MCPA ester† (0.38 L/acre - 600 g/L forms)	•	•	•	•	•	•	
Prestige XC†††	•	•	•††	•			

† Manufacturers may support different brands of generic products with their product. Check the tralkoxydim product label for specific brands registered.

†† *Liquid Achieve* only.

††† *Liquid Achieve* and *Marengo* only.

* **Tank mixes may result in some temporary initial injury under adverse environmental conditions.**

** **Temporary crop injury can occur if applied prior to the 4 leaf stage. A reduction in wild oat control may occur with this mix.**

*** *Buctril M* mixed with either *Liquid Achieve* or *Marengo* only in winter wheat, fall rye and triticale.

DO NOT tank mix tralkoxydim products with herbicides or formulations of herbicides not listed above as loss of grass control may result.

When applying broadleaf herbicides not listed above, in the same field, always apply tralkoxydim first. Apply the broadleaf product no sooner than seven days after application of tralkoxydim.

Insecticides:

Matador (49 mL / acre)

Matador tank mixes with *Bison* may also be combined with **bromoxynil or bromoxynil / MCPA ester products.**

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *tralkoxydim* labels only.

Various manufacturers may also support additional mixes that are not on the *tralkoxydim* labels. Check with manufacturers for more details.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour will reduce control.

Re-entry: DO NOT enter treated field for 12 hours.

Grazing: Straw from treated grain crops may be fed to livestock. Immature cereal crops may be grazed or cut for hay 16 days after treatment. DO NOT feed or graze forage crops in year of treatment

Preharvest: Leave 60 days from application to harvest.

Re-cropping: DO NOT replant treated areas to tame oat or corn for at least 4 weeks after application.

Aerial Application: May be applied by air to cereal crops only. DO NOT apply within 50 m of fish bearing waters and wildlife habitat.

Storage: Store in a dry place. DO NOT freeze.

Buffer Zones:

Application method	**Buffer Zones (metres†) Required for the Protection of:**
	Terrestrial habitat
Ground*	3
Helicopter	80
Fixed wing aircraft	100

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general seciton on sprayer cleaning on page 15 to 16.

Hazard Rating:

▽ Caution – Skin and Eye Irritant

For an explanation of the symbols used here see page 11.

Travallas

Herbicide Group
2 - metsulfuron, thifensulfuron
4 - fluroxypyr
(Refer to page 45)

Company:

E.I. Dupont Canada (PCP#31685)

Formulation:

3 g ai/L metsulfuron methyl; 30 g ai/L thifensulfuron methyl; and 150 g ae/L fluroxypyr ester formulated as suspension concentrate liquid.

Container size - 2 x 8 L.

Crops, Rates and Staging:

Barley, Wheat (spring, durum):
Apply 0.2 L per acre from the 2 leaf to flag leaf stage (prior to head emergence).

Maximum one application per year of *Travallas* or other products containing metsulfuron, thifensulfuron or fluroxypyr.

Weeds and Staging:

Weeds controlled up to 10 cm tall or wide unless otherwise indicated:

Canada thistle (maximum 15 cm and prior to bud)*
Cleavers (1 to 6 whorl)
Common chickweed (1 to 6 leaf)
Corn spurry
Cow cockle
Dandelion (fall or spring germinating rosettes up to 25 cm)
Flixweed
Hemp-nettle
Kochia
Lamb's-quarters
Narrow-leaved hawk's-beard
Redroot pigweed
Russian thistle
Smartweed (Lady's-thumb, green)
Stinkweed
Stork's-bill
Volunteer canola (except Clearfield varieties)
Wild buckwheat (1 to 8 leaf)
Wild mustard
White cockle

* Suppression only

Application Information:

Water Volume:
Ground: Minimum 22 L per acre.
Aerial: Apply in between 10 and 20 L/acre of water
Nozzles and Pressure: Use 30 to40 psi (210 to 275 kPa) if applying without drift reduction nozzles. Drift reduction nozzles may require higher pressures for proper performance. Select the nozzle and pressure combination that produces of ***ASABE coarse*** droplets while maintaining good coverage of foliage. Use of 50 mesh screens or coarser are required. Keep booms lower than 60 cm from crop canopy.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Application to crops stressed by extreme weather conditions such as frost, hail, saturated soils or drought as well as low fertility, insect damage or disease pressure may result in crop injury and/or reduce weed control. The conditions above as well as wide fluctuations in day/night temperatures or prolonged cool weather may shorten the crop slightly.

Crop and weeds that are growing rapidly produce optimum activity. The optimum temperature range for the best activity is between 12 to 24 degrees C. Activity will be reduced below 8 degrees C and above 27 degrees C.

Tank Mixes:

Tank mix partners applied at all label rates and include recommended adjuvants unless otherwise noted.

Herbicides:
In barley and spring wheat (including durum) only:
MCPA Ester (up to 113 g ae per acre)

In spring wheat (including durum) only:
Simplicity plus surfactant
Traxos

In spring wheat (NOT including durum) only:
Flucarbazone (*Everest 2.0* only)

Insecticides: None registered.

Fungicides:
In Barley and spring wheat (including durum) only:
Acapela

Fertilizers: None registered.

Note: The above mixes are those listed on the *Travallas* label only.

E.I Dupont Canada supports the following mixes that are not on the *Travallas* label. Apply mixes according to the most restrictive use limitations for either label.

Herbicides:
Barley and spring wheat (NOT including durum): *Axial BIA*

Spring wheat (including durum) only:
Clodinafop (*Horizon NG* only)

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 2 hours will reduce control.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing: DO NOT graze or feed treated crop to livestock within 7 days of application.

Preharvest: Leave 60 days between application and harvest.

Re-cropping: Canola, flax, oats, field peas, and registered crops may be seeded the season after application.

Aerial Application: May be applied by aircraft.

Storage: Store in a cool, dry place in original container. Shake well before using. If frozen, warm gradually to 10 degrees C and shake well to reconstitute component before use.

Buffer Zones:

Crop	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground application	1	1	5
Aerial (fixed wing)	1	1	200
Aerial (helicopter)	1	1	175

See the key to product pages on page 27 for an explanation of the different habitats.

* **Buffer zones may be reduced when using drift reduction measures. See the Buffer Zone Calculator on the Pest** Management Regulatory Agency web site.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Spray when winds are under 16 km/hr, but not dead calm.

Tank Cleaning:

Thifensulfuron/tribenuron **and/or** ***metsulfuron*** can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray ***Thifensulfuron/tribenuron*** **and /or** ***metsulfuron*** should be drained and flushed out immediately after use.

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. When mixing with another pesticide with different cleaning measures, those measures should be integrated into 'Method A' (e.g. addition of detergent).

Hazard Rating:

▽ Caution - Skin Irritant
Potential skin sensitizer
Contains the allergen soy.

For an explanation of the symbols used here see page 11.

Traxos

Herbicide Group

1 - pinoxaden and clodinafop
(Refer to page 45)

Company:

Syngenta Canada

Formulation:

25 g/L pinoxaden and 25 g/L clodinafop propargyl formulated as an emulsifiable concentrate.

Container size - 2 X 10 L, 80 L, 400 L.

Crops and Staging:

Spring wheat (including durum) - prior to the emergence of the 4th tiller.

When tank mixing, check broadleaf product description for additional restrictions.

Weeds, Rates and Staging,

0.5 L per acre, no additional adjuvant required (packages treat 40, 160 and 800 acres). Maximum one application of this product or those with the same ingredients in a season.

For control of:

WEED	STAGE
Barnyard grass, Persian darnel	1 to 5 leaves prior to tillering
Green and yellow foxtail	1 to 5 leaves, maximum 2 tillers
Volunteer canaryseed, Volunteer oats, wild oats, proso (Crown) millet	1 to 6 leaves, maximum 3 tillers

Optimum yield response occurs when weeds are controlled in early stages.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume:

Ground – Minimum 20 L up to 40 L per acre.
Aerial* – Minimum 12 L / acre.

Nozzles and Pressure: 40 to 45 psi (275 to 310 kPa) when using conventional 80° or 110° flat fan stainless steel nozzles tilted forward at an angle of 45°. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE coarse*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance activity. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Herbicides:

*Buctril M** (label rates)
Curtail M (0.6 to 0.81 L / acre)
Infinity (0.33 L / acre)
MCPA 600 ester (0.28 to 0.37 L / acre)
Mextrol 450M (0.5 L / acre)
Pulsar (80 acres / case)
Pulsar (80 acres / case) + *MCPA 600 ester* (0.23 L / acre)
Trophy (20 acres per case)

Refer to the broadleaf herbicide label for crop staging, and other information.

Insecticides: *Matador* (25 to 33 mL / acre).

Fungicides: *Tilt* (0.1 L* to 0.2 L / acre).

Fertilizers: None registered.

* Aerial application approved.

Note: The above mixes are those listed on the *Traxos* label only.

Syngenta also supports the following mixes that are not on the *Traxos* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Attain XC* (low label rate), *Barricade II, Broadside, Enforcer D, Enforcer M, Momentum+MCPA ester, OcTTain XL, Paradigm, Pixxaro, Prestige XC, Pulsar + Express SG* (up to 6 g / acre), *thifensulfuron/tribenuron + MCPA, Retain, Stellar, Thumper*

Fungicides: *Fuse* (see *tebuconazole*): *Propel, Quilt*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze or harvest treated crops for forage within 7 days of application.

Preharvest: Leave at least 60 days from application to harvest.

Re-cropping: No restrictions in the year following treatment.

Storage: Store in a cool, dry, ventilated are away from food or feed. Avoid ignition sources. If frozen, thaw and shake well before using.

Aerial Application: May be applied by air.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground	1	0	1
Aerial by airplane or helicopter	1	0	15

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

◇ Warning - Skin Irritant

For an explanation of the symbols used here see page 11.

TraxosTwo

Herbicide Group
1 – pinoxaden, clodinafop
4 – fluroxypyr, 2,4-D
(Refer to page 45)

This product is a prepackaged tank mix of *TraxosTwo Grass* (equivalent to *Traxos* – see page 314) and *TraxosTwo Broadleaf* (equivalent to *OcTTain* - see fluroxypyr+2,4-D on page 184). Information listed is restricted to Crop, Weeds, Rates and Tank mixes. For other detailed restrictions and other general information on the component products see the product pages listed above.

Company:

Syngenta Canada

Formulation:

The *TraxosTwo* package contains the following components:

TraxosTwo Grass Component **(PCP#31674):**
25 g/L pinoxaden and 25 g/L clodinafop-propargyl formulated as an emulsifiable concentrate.
Container size - 10 L

TraxosTwo Broadleaf Component **(PCP#31673):**
90 g/L fluroxypyr plus 360 g/L 2,4-D LV ester formulated as an emulsifiable concentrate.
Container size - 9 L.

Crops and Staging:

Spring wheat (including durum): Apply from the 4 leaf stage up to the emergence of the fourth tiller.

Rates:

TraxosTwo Grass Component: 0.5 L/acre

TraxosTwo Broadleaf Component: 0.45 L/acre

One case treats 20 acres

Weeds and Staging:

Weeds controlled by *Traxos* plus the weeds controlled by *Octtain*.

See component products for more information on restrictions application details and handling. Use the most limiting restrictions across all components for the mix.

Tribenuron

Herbicide Group
2 - tribenuron
(Refer to page 45)

Company:

E. I. duPont Canada (*Express SG*)
Nufarm Agriculture (*Spike*)
FMC of Canada (*Nuance*)
Famers of North America (*MPower X*)
Arysta Lifescience (*Inferno WDG*)

Formulation:

***Express SG* (PCP#28262):** 50% tribenuron methyl, formulated as a water soluble granule (WSG).

75%WDG formulations
(*Nuance* - PCP#29468; *MPower X* - PCP#30964; *Inferno WDG* - PCP#30838; *Spike* - PCP#30376): 75% tribenuron methyl, formulated as a water dispersible granule (WDG).

Container sizes -
***Express SG**:** 486 g.

MPower X*; Inferno WDG* and Nuance*: 320 g.

Spike: 160 g, 3.6 kg

* All products are purchased alone but must be used accordingly in combination with a registered tank mix herbicide.

Crops and Staging:

Tribenuron + glyphosate:
In the fall or spring prior to the seeding of:

Field Crops:
Barley
Canary seed†
Dry bean†
Fababean†
Lupin†
Oat†
Pea†
Soybean†
Wheat (spring, durum, winter†)

Forage Crops†:*
Alfalfa
Alsike clover
Bromegrass (meadow, smooth)
Creeping red fescue
Red clover (forage and seed production)
Timothy†

Allow at least one day (24 hours) between application and seeding.

In the fall prior to seeding:
The crops listed above plus:
canola†
flax†
lentil†

Fallow: Allow 10 days between application and tillage (fallow).

NOTE: **Injury to pulse crops, forage grasses and forage legumes** may occur on coarse-textured soils, low in organic matter (less than 3%), or in fields with variable soils, gravely areas, sandy areas or eroded knolls. Avoid planting pulse crops in soils containing more than 50% sand.

** NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for herbicide performance.* ***Those who apply these uses do so at their own risk.***

Tribenuron + 2,4-D ester:
Fallow††
Wheat (spring and durum), barley††† - 3 leaf up to emergence of the flag leaf.

Express SG† plus non-ionic surfactant:
Post-emergent in rangeland and pasture - stage according to weeds.

Express SG + Hasten NT adjuvant:
Tribenuron tolerant sunflower† (eg. *ExpressSun SU7* variety) - 2 to 8 leaves.

† *Express SG* only.

†† *Express SG, Inferno WDG, MPower X* and *Nuance* only.

††† *Inferno WDG, MPower X* and *Nuance* only.

Weeds, Rates and Staging,

Pre-seeding application and fallow mixed with glyphosate◊:
Express SG *at 6 g per acre or 75%WDG tribenuron formulations at 4 g per acre plus glyphosate (any brand) at 180 g ae per acre (see* glyphosate *pages for equivalent product rates.)*

Weeds controlled by glyphosate products at the rates above plus:

Canada thistle rosettes**
Cow cockle *
Dandelion (up to 6 inches)
Narrow-leaved hawk's-beard
Scentless chamomile†**
White cockle (rosettes)†**
Volunteer canola (including glyphosate tolerant varieties)***

Fallow[◇]

***Express SG* 6 g per acre or *Inferno WDG; MPower X* and *Nuance* at 4 g per acre plus *2,4-D ester* 170 g (6 oz.) ae per acre (e.g. 0.24 L per acre LV 700 formulation):**

Weeds controlled by 2,4-D ester 170 g (6 oz.) ae per acre plus:

Flixweed[◇◇]
Stinkweed[◇◇]

Post-emergent in barley and spring wheat (including durum):

Nuance, Inferno WDG and MPower X only at 4 g per acre plus 2,4-D ester 170 g (6 oz.) ae per acre (e.g. 0.24 L per acre LV 700 formulation);

Weeds controlled by *2,4-D* plus the following weeds up to 4 inches (10 cm) unless otherwise indicated:

Annual sunflower
Canada thistle (top growth)
Cow cockle
Redroot pigweed
Wild buckwheat (1 to 3 leaf)[**]

Post-emergent for control of the emerged weeds below in Rangeland and Pasture only:

Express SG *only at 6 g per acre*[◇◇◇] *at the early bud – pre-bloom stage;*

Tall buttercup
Narrow-leaved hawk's-beard

Express SG *only at 12 g per acre*[◇◇◇]

The weeds listed above plus:

Dandelion
Common tansy
White cockle

Post-emergent in Tribenuron Tolerant Sunflowers:

Express SG *only at 6 g per acre (one 486 g package of* Express SG *treats 80 acres) plus* Hasten NT *adjuvant at 0.5L per 100L of spray solution will control:*

Lamb's-quarters (up to 9 leaf)
Wild buckwheat[**] (up to 6 leaf)

[†] *Express SG* only.
[*] Up to the 3 leaf stage
[**] Suppression only
[***] Up to 6 inches
[◇] Allow 10 days between treatment and tillage.
[◇◇] Fall rosettes and spring seedlings.
[◇◇◇] Addition of a non-ionic surfactant at 0.2 L per 100 L of spray solution is required.

Tribenuron may degrade if left in the sprayer for an extended period. ***Apply within 24 hours of mixing.***

Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 22 to 40 L per acre.

Nozzles and Pressure: Use appropriate pressure for nozzle. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets or larger. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Warm, moist growing conditions promote active weed growth and enhance the activity of *tribenuron*. Weeds hardened off by environmental stress such as cold weather, drought or excessive heat may not be adequately controlled.

Tank Mixes:

Herbicides:

Prior to seeding registered crops (all products):
Must be mixed with glyphosate.

Fallow: All products
Must be mixed with either *glyphosate* or *2,4-D ester*.

In spring wheat (including durum) and barley (Nuance Inferno WDG and MPower X only):
Assert (0.53 to 0.65 L / acre);
Fenoxaprop (*Cougar* and *Cordon* only - 155 mL / acre).

In spring wheat (NOT durum) and barley (Nuance; Inferno WDG and MPower X only):
Banvel II (44.5 mL / acre)

***Tribenuron Tolerant Sunflowers* (*Express SG* only):**
Assure II (label rates) plus *Merge* or *Suremix* adjuvants.

Insecticides: None registered.

Fungicides: None registered.

Fertilizers: None registered.

Note: The above mixes are those listed on the *tribenuron* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check product labels for directions.

General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours will reduce control.

Re-entry: DO NOT enter treated fields for 12 hours.

Grazing:
75% WDG formulations: DO NOT graze treated crops within 30 days of application.
Express SG: Forage may be grazed immediately following application.

Preharvest Interval:
75% WDG formulations: **Leave 60 days between spraying** and harvest of cereals.
Express SG: **Leave 70 days between spraying and harvest** of sunflower.

Re-Cropping: There are no restrictions one year after treatment.

75% WDG formulations: Canola, flax, lentil and alfalfa may be planted 2 months after application.

Express SG: Canola, flax, and lentil may be planted 2 months after application or in the spring following a fall application.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Fallow, preseed, range and pasture	1	0	4
Tribenuron tolerant sunflowers	0	0	3

See page 36 for an explanation of the different habitats.

[*] **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance is measured from the downwind edge of the boom to sensitive areas.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

Tribenuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray *Tribenuron* should be flushed out immediately after use. Refer to 'Method A' in the general section on sprayer cleaning on page 15 to 16. **This ammonia rinse process should be done twice for the WDG formulations.** See the labels of the various products for specific instructions. The addition of detergent may improve cleanout, especially when mixing with other products.

Hazard Rating:

Express SG **and** ***Spike*:**

◇ Warning – **Eye Irritant**
Potential Skin Sensitizer

Nuance*, *MPower X **and** ***Inferno WDG*:**

▽ **Caution – Eye and skin irritant**

All products:

◇ Warning – Contains the allergens milk and sulfites

For an explanation of the symbols used here see page 11.

Tribenuron/Metsulfuron

Herbicide Group
2 - tribenuron & metsulfuron
(Refer to page 45)

Company:

E. I. duPont Canada (*Express Pro* PCP#29212)
FMC of Canada (*Nuance Pro* - PCP#31873)

Formulation:

42.9% tribenuron methyl, and 8.6 % metsulfuron methyl formulated as a water soluble granule.

Container size - 560 g container.

Tribenuron/Metsulfuron is purchased alone but must be mixed with glyphosate before use.

Crops and Staging:

For application to summer-fallow, post-harvest* and prior to seeding of the following crops:

Spring wheat
Durum wheat
Winter wheat
Barley

Allow at least one day (24 hours) between application and seeding.

Fallow and Post-harvest* application:
Allow 10 days between fallow or post-harvest* treatment and tillage.

DO NOT use *Tribenuron/Metsulfuron* on highly variable soils that have large gravely or sandy areas, eroded knolls or calcium deposits.

* *Express Pro* only.

Weeds, Rates and Staging:

***Tribenuron/Metsulfuron* at 7 g per acre (one container treats 80 acres) plus glyphosate at a rate equivalent to 180 g ae per acre (equivalent of 0.5 L per acre of a 360 g per L formulation):**

Weeds controlled by glyphosate products at these rates plus up to 3 inches (8 cm) unless otherwise indicated:

Canada thistle rosettes**
Cleavers†
Cow cockle*
Dandelion ***†
Narrow leaved hawk's beard†
Night-flowering catchfly**
Scentless chamomile
White cockle (rosettes)
Volunteer canola (including glyphosate tolerant varieties) ***†

† Residual control
* Up to the 3 leaf stage
** Suppression only
*** Up to 6 inches

Tribenuron/Metsulfuron may degrade if left in the sprayer for an extended period. Apply within 24 hours of mixing.

Apply a maximum of one application of *Express Pro, Nuance Pro* or other products containing the ingredients tribenuron or metsulfuron per year.

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: 22 to 45 L per acre.
Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets. Low drift nozzles may require higher pressures for proper performance.
Screens: Use 50 mesh or larger screens in both nozzles and in line filters.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Registered crops seeded following *Tribenuron/Metsulfuron* application become stressed by drought, low fertility, saline soils, waterlogged soils (soils at or near field capacity), disease or insect damage may be injured. This injury may be worse on light or low organic matter soils. Weeds hardened off by environmental stress such as those above may not be adequately controlled.

Tank Mixes:

Herbicides: Must be mixed with glyphosate.
Insecticides: None registered.
Fungicides: None registered.
Fertilizers: None registered.
Note: The above mixes are those listed on the *Tribenuron/Metsulfuron* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check product labels for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No rainfast period is specified on the label; required interval may be up to 8 hours. Contact manufacturers for more information.

Re-Entry: Wait 12 hours before re-entering treated fields.

Re-cropping: Barley and wheat (spring, winter and durum) may be seeded a minimum of 24 hours after application. Oats may be seeded the season following application. Canola, flax and peas may be planted 10 months following application.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat*
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	4

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Tribenuron/Metsulfuron can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use.

Refer to 'Method A' found in the general sprayer cleaning section on page 15 to 16. Check the label or contact the manufacturer for more specific sprayer cleaning information information.

Hazard Rating:

Express Pro only:

☠ Caution - Poison

◇ Warning - **Eye Irritant**

▽ Potential Skin Sensitizer.

Both Products:

▽ Contains the allergens sulphites and milk.

For an explanation of the symbols used here see page 11.

Trifluralin

Herbicide Group
3 - trifluralin
(Refer to page 45)

Company:

Dow AgroSciences (*Treflan*)
Nufarm Agriculture (*Rival*)
Loveland Products Canada (*Bonanza*)

Formulation:

Bonanza 480 EC **(PCP#28289):** 480 g/L **trifluralin** formulated as an emulsifiable concentrate.
Container size - 9.45 L, 205 L.

Bonanza 10G **(PCP#22744):** 10% trifluralin formulated as a granular.
Container size - 22.7 kg, 500 kg bags.

Rival EC **(PCP#18612):** 500 g/L **trifluralin formulated as an** emulsifiable concentrate in.
Container size - 9 L, 900 L.

Rival 10G **(PCP#18926):** 10% trifluralin formulated as a granular.
Container size - 22.7 kg, 454 kg bags.

Treflan EC **(PCP#23933):** 480 g/L **trifluralin formulated** as an emulsifiable concentrate.
Container size - 9.45 L, 115 L.

Crops and Staging:

Certain formulations are not registered for all the crops listed here. Refer to the specific product label for details. All products are for pre-plant incorporated use only.

Fallow use in the brown soil zone of Saskatchewan (Granular products only): Spring wheat (including durum).

Not for use in Manitoba.

Apply to fallow fields in May, June, or July for weed control during both years of a fallow-wheat rotation or in the fall (September or October) or spring prior to wheat seeding.

DO NOT apply following harvest when the previous crop was treated with another trifluralin product (*Treflan, Rival* or *Bonanza*). This includes application the previous summer or fall.

DO NOT apply trifluralin following harvest or to fallow when the previous year's crop was an oilseed, barley or pulse crop treated with a deep incorporated, spring or fall applied trifluralin product.

Green and Yellow Foxtail Control in Cereals:

Liquids applied in spring only (after seeding but prior to crop emergence) - spring wheat (including durum), barley.

Granulars applied in fall only (after September 1 but before freeze-up) - spring wheat (including semi-dwarf and durum).

Broadleaf and Grassy Weed Control in other crops:

Spring applied liquid or granular formulations:

Canola, pea, sunflower, safflower (liquid formulations), dry bean, mustard, fababean, alfalfa, sainfoin, sweet clover, soybean, forage legumes (cicer milk-vetch, seedling alsike clover, red clover, bird's-foot trefoil).

Fall applied granular formulations: Canola, pea, sunflower, dry bean, mustard, fababean, soybean, barley, lentil and flax.

Trifluralin liquids only: prior to planting shelterbelt transplants (elm, caragana, green ash, Scots pine).

Weeds:

Fallow use in the brown soil zone of Saskatchewan (Granular products only):
Fallow Year:

Barnyard grass
Cow cockle
Green foxtail
Lamb's-quarters
Persian darnel
Redroot pigweed
Russian thistle*
Wild buckwheat
Wild oat

Crop Year:

Green foxtail
Lamb's-quarters
Wild buckwheat *
Wild oat *

* Suppression only

Green and Yellow Foxtail Control in Cereals:
Foxtail (green and yellow)

Broadleaf and Grassy Weed Control in other crops:

Barnyard grass
Brome (downy, Japanese)
Chickweed
Cow cockle
Foxtail (green, yellow)
Knotweed
Lamb's-quarters
Persian darnel
Pigweed
Purslane
Wild buckwheat*
Wild oats†*

* Some plants may escape herbicide treatment but are not competitive with the crop.
† Suppression only with *Treflan EC* and *Bonanza 480 EC*.

Rates and Staging:

Fallow use in the brown soil zone of Saskatchewan (Granular products only):

DO NOT apply to sandy soils with less than 1% organic matter. Application to severely eroded knolls is not recommended. DO NOT apply to wet soils, soils in poor working condition, soils which contain more than 8 percent organic matter, or soils subject to prolonged periods of flooding.

Granules may be applied to fallow fields or following harvest, provided crop residues or green growth do not interfere with cultivation (prevent soil mixing).

Over-application caused by overlapping, improper calibration or non-uniform application may result in reduced crop stand, delayed development or reduced yields.

	RATE (KG/ACRE)	
Soil Organic Matter (%)	**1 to 3**	**4 to 8**
May	3.85	4.5
June	3.25	3.85
July	2.65	3.25
	2 to 8% Organic Matter	
September to October	2.23*	

* Control of green foxtail only, on soils between 2 to 8% organic matter.

During the fallow year, susceptible weeds may not be fully controlled until after the second fallow operation has established a uniform layer of treated soil. Control of wild oats in the crop year may be variable depending on wild oat population as well as soil and climatic conditions. Some wild buckwheat may escape but its growth will be retarded and result in limited competition to the wheat crop.

Pre-emergent control of green and yellow foxtail:

Liquids

PRODUCT	RATES (L/ACRE)	
	LIGHT AND MEDIUM SOIL TEXTURE	HEAVY SOIL TEXTURE
Rival EC	0.49 to 0.57 L	0.65 L
Treflan EC, Bonanza 480 EC	0.49 L	0.69 L

Granulars products (wheat only)

Rival 10G / *Bonanza* 10G at 2.23 kg per acre in all soil textures with 2 to 8 % organic matter.

Broadleaf and Grassy Weed Control in other crops:

For use in canola, pea, sunflower, dry bean, mustard, fababean, seedling alfalfa (spring only), seedling sweet clover (spring only), soybean.

	SOIL TYPE			
	Light soils with less than 6% organic matter		Medium to heavy soils with 6 to 15% organic matter	
PRODUCT	Spring	Fall	Spring	Fall
Rival EC	0.65 L / acre	0.89 L / acre*	0.89 -1.13 L / acre	1.13 -1.37 L / acre*
Rival 10G	3.43 kg / acre**	4.45 kg / acre	4.45 -5.67 kg / acre**	5.67 -6.88 kg / acre
Treflan EC	0.69 L / acre	0.93 L / acre*	0.93 -1.21 L / acre	1.21 -1.37 L / acre*
Bonanza 10G	Not registered	4.45 kg / acre	Not registered	5.67 -6.88 kg / acre
Bonanza 480 EC	0.69 L / acre	0.93 L / acre*	0.93 L / acre	1.17 L / acre*

* Although liquid formulations are registered for fall application, this use is not recommended as tillage requirements before and after application will predispose fields to erosion.

** Spring applications of granular formulations are recommended for Manitoba only.

For use in barley (fall only), apply:

PRODUCT	SOIL TYPE					
	2 to 4% organic matter		4 to 6% organic matter		6 to 10% organic matter	
	Light Soil Texture*	Medium to Heavy Soil Texture**	Light Soil Texture*	Medium to Heavy Soil Texture**	Light Soil Texture*	Medium to Heavy Soil Texture**
Rival 10G, Bonanza 10G	3.44 kg / acre	3.44 kg / acre	4.45 kg / acre	4.45 kg / acre	4.45 kg / acre	5.67 kg / acre

* Light textured soils can be defined as sandy to sandy-loam.
** Medium to Heavy textured soils can be defined as loam to clay.

For use in flax or lentils (fall only), apply:

PRODUCT	SOIL TYPE			
	Soils with 2 to 6% organic matter		Soils with 6 to 15% organic matter	
	Light Soil Texture*	Medium-Heavy Soil Texture**	Light Soil Texture*	Medium-Heavy Soil Texture**
Rival 10G, Bonanza 10G	4.45 kg / acre	4.45 to 5.6 kg / acre***	5.67 kg / acre	5.67 to 6.88 kg / acre
Bonanza 480 EC	0.93 L / acre	0.93 L / acre	1.17 L / acre	1.17 L / acre
Treflan EC	0.93 L / acre	1.21 L / acre	1.21 L / acre	1.21 - 1.38 L / acre
Rival EC	0.89 L / acre	1.13 L / acre	0.89 L / acre	1.13 - 1.38 L / acre

* Light textured soils can be defined as Sandy to Sandy-loam.
** Medium to Heavy textured soils can be defined as loam to clay.
*** Rates vary among products. Refer to product label for specific information.

Application:

Liquid Formulations:

Water Volume: Minimum 40 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets or larger.

Dry Granular Formulations: Use equipment capable of metering granular herbicides and applying in an even layer over the surface of the soil. Close applicator lid after filling to avoid prolonged exposure to direct sunlight.

Incorporation:

Fallow use in the brown soil zone of Saskatchewan:

Apply granules to the soil surface and incorporate immediately, in the same operation if possible. DO NOT delay incorporation more than 24 hours after application. Use a deep tillage cultivator, field cultivator or disc implement set to work 2 to 3 inches (5 to 8 cm) deep, and operating at 8 to 10 km/hr. Granules should not be incorporated when soil is crusted, lumpy or too wet for good mixing action.

May - July: A second incorporation at the same depth and at an angle to the first should be done when weed growth requires it. Wait at least one week before making the second incorporation. After completing two fallow incorporations, additional operations with a rod weeder, shallow tillage or fall 2,4-D application may be required to control remaining weed growth.

September - October: A second incorporation may be done in the fall a minimum of 3 days later. Alternatively, to conserve crop residues cover through the winter, the second incorporation can be completed in the spring at the same depth and at an angle to the first incorporation. When both incorporations take place in the fall, shallow spring tillage should be completed in the spring. If a discer or air seeder is used for seeding, separate spring tillage may not be necessary.

NOTE: Fall application is not recommended on soils where a lack of crop residue cover combined with the required incorporation would leave the soil vulnerable to erosion.

Spring (In the year of seeding): Apply granules and incorporate immediately, in the same operation if possible. DO NOT delay the first incorporation longer than 24 hours after application. The second incorporation must be delayed a minimum of 3 days following the first incorporation. When applied to cold soils, wait 14 days before making second incorporation.

The second incorporation should be done at an angle to the first incorporation, and at the same depth. If a discer or air seeder is used for seeding, the seeding operation can be used as the second incorporation.

Green and Yellow Foxtail control in Cereals:

Liquid formulations: Apply and incorporate in spring just after seeding. Incorporate to a depth of 1 to 1.5 inches (2 to 4 cm) into a bare soil free of crop residues (80 percent black when viewed from above) using diamond or tine type harrows operated at a speed of 6 mph (9 km/h). Incorporate twice, with the second incorporation at right angles to the first. The first incorporation should be performed immediately in the same direction of application. Both incorporations should be done within 24 hours of application. When tank mixing liquid formulations with *Avadex BW*, follow the same incorporation procedure.

Granular formulations: May be applied to standing or pre-worked stubble. Very heavy trash fields should be worked prior to application to allow product penetration to the soil surface. Incorporate with cultivators or disc implements only. Perform the first tillage operation within 24 hours of application. Incorporate at a working speed of 5 to 8 mph (8 to 13 km/hr) and to a depth of 2 to 3 inches (5 to 8 cm). Wait a minimum of 5 days, then incorporate a second time at right angles to the first. This second incorporation may be delayed until the following spring. Subsequent working should be no deeper than 2 to 3 inches (5 to 8 cm).

Broadleaf and Grassy Weed Control in other crops:

Granular formulations are recommended for use in fall or spring as a pre-plant incorporated treatment on broadleaf crops listed on the product label. The liquid formulations should be used only on soils free of lumps and relatively free of crop residues (75% black) and are recommended only for spring use. Granular formulations may be applied to standing or pre-worked stubble. Very heavy crop residues should be worked prior to application to allow product penetration to the soil surface. DO NOT use liquid or formulations of trifluralin as a pre-plant incorporated treatment in barley, as severe injury will result. Only the fall applications of *Rival 10G*, and *Bonanza 10G* are registered for use as pre-plant incorporated treatments in barley. For fall application of granular formulations, work the chemical into the soil between September 1 and freeze-up. Use a discer or field cultivator (vibrating shank type). Disc implements are preferred on stubble. Set equipment to cut at 3 to 4 inches (8 to 10 cm) depth. The initial incorporation should be done within 24 hours of application.

The second incorporation should be done at right angles to the first. The second incorporation may be delayed until spring, except when planting barley, flax or lentils; for these crops both incorporations must be done in fall. Delay the second incorporation 5 days for better weed control. This will allow greater release of the chemical onto soil particles and assure more even distribution. Fall application of granular trifluralin on flax, lentils or barley is not recommended on soils prone to erosion, as the 2 fall incorporations necessary in these crops may leave soils vulnerable to wind or water erosion.

For spring application of liquid and granular formulations, work the chemical into the soil prior to seeding by setting the implement at 3 to 4 inches (8 to 10 cm) cutting depth. The first incorporation must be done within 24 hours of application. The second incorporation must be done at right angles to the first. If incorporating granular trifluralin, delay the second incorporation for 3 days after the first to achieve better weed control.

Seeding:

Fallow use in the brown soil zone of Saskatchewan: Allow soil to warm before seeding to reduce risk of injury to crop. Place seed 1.25 to 2.5 inches (3 to 6 cm) deep. If spring seedbed preparation is required, set cultivator 2 inches (5 cm) deep. To reduce the risk of wheat injury, use good quality seed and agronomic practices that will promote good growing conditions. Avoid deep seeding, loose seedbeds and seeding into cold soils. If extended dry periods were present after a fallow application, a 10 percent increase in seeding rate is recommended.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Prolonged drought conditions after a May-July application to fallow may result in higher levels of trifluralin in the soil at the time of seeding.

Injury to flax, barley, wheat or lentil may occur if soil and weather conditions are not conducive to rapid crop emergence (cold or dry soils at the time of seeding and crop emergence).

To minimize crop injury, seed into a firm, moist seed bed using a seeder with good depth control and on row packing. Plant barley no deeper than 2 inches (5 cm). Plant cereals, lentil and flax no deeper than 1.5 inches (4 cm).

Less than acceptable weed control will result if dry conditions prevail at the time of weed emergence.

Rainfall has no direct effect on products' activity. Flooding (3 to 5 days) will cause rapid breakdown of the product resulting in reduced weed control. Flooding for 3 weeks or more will result in total breakdown of the product resulting in loss of weed control.

Tank Mixes:

Herbicides:

Soybeans:

Sencor (*Treflan EC* only).

Fertilizers: Liquid product may be applied with liquid fertilizer as a carrier. Before the herbicide is added to the tank, compatibility of the herbicide to liquid fertilizer should be tested following instructions on the herbicide container. *Trifluralin* liquids may be blended with dry bulk fertilizers (DO NOT mix with nitrate fertilizers). Check label for blending instructions.

Insecticides: None registered.

Fungicides: None registered.

Note: The above mixes are those listed on the *Trifluralin* labels only.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: No restriction. Flooding may reduce weed control.

Re-entry: Wait at least 12 hours before entering treated fields.

Grazing: DO NOT graze the treated crops or cut for feed prior to crop maturity.

Re-cropping: Oat, canaryseed, and small seeded grasses may be affected the year after treatment. Corn is sensitive at higher rates of application. Damage to wheat can occur if the crop is seeded into land that has been treated during the previous 21 months with trifluralin products and has received abnormally low amounts of precipitation. Damage is worse if conditions are not conducive to rapid emergence of the wheat (for example, if the crop is seeded deep or if soil conditions remain cool during emergence). Damage tends to be greater on fields treated with granular formulations.

Aerial Application: DO NOT apply by air.

Storage: Granular formulations must be stored in a cool, dry location, out of sunlight.

Rival EC: DO NOT store below 5°C.

Treflan EC: DO NOT freeze.

Bonanza 480 EC: DO NOT freeze.

Recommendations for liquid formulations: Crystallization of the active ingredient may occur at less than 5°C. To reconstitute, bring temperature to 15°C and shake well until no crystals are visible. This should be done before adding to the spray tank.

Buffer Zones: (liquid formulations only)

CROP	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Field crops	80	10	1
Shelterbelts, woody crops	120	20	1

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Sprayer Cleaning:

Refer to 'Method B' in the general section on sprayer cleaning on page 15 to 16.

Hazard Rating:

Bonanza 480 EC:

◈ Warning - Poison

◇ **Warning – Eye and Skin Irritant**

All products:

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Triton C

Herbicide Group
2 - thifensulfuron & tribenuron
4 - quinclorac
(Refer to page 45)

Company:

E. I. du Pont Canada (PCP#28622)

Formulation:

51.55 % quinclorac + 10.30 % thifensulfuron methyl + 5.15 % tribenuron methyl formulated as a water dispersible granule.

Container size - 1.566 kg

Crops and Staging:

Spring barley, wheat (including durum, and spring) - 2 to 5 leaf stage.

When tank mixing, always check the tank mix partner recommendations for additional staging restrictions

Weeds and Staging:

Unless otherwise noted below, apply to young and actively growing weeds that are less than 4 inches (10 cm) in height or width.

Weeds Controlled:

Annual smartweed (green, lady's-thumb)
Ball mustard
Chickweed (1 to 6 leaf)
Cleavers (1 to 4 whorls)
Common groundsel
Corn spurry
Cow cockle
Flixweed
Hemp-nettle
Lamb's-quarters
Narrow-leaved hawk's-beard
Redroot pigweed
Round-leaf mallow (2 to 6 leaf)
Russian thistle
Shepherd's-purse
Sow-thistle, annual
Stinkweed
Stork's-bill (2 to 6 leaves)
Tartary buckwheat
Volunteer canola (not CLEARFIELD varieties)
Volunteer sunflowers
Wild buckwheat (1 to 5 leaf)
Wild mustard

Weeds Suppressed:

Canada thistle, perennial sow thistle (less than 6 inches (15 cm) tall or across and prior to budding)
Scentless chamomile
Toadflax (less than 6 inches or 15 cm tall)
Volunteer flax

Rate:

39.25 g per acre. Limit to one application of this product or other products containing the same ingredients per year.

(One 1.566 kg container treats 40 acres)

***Merge adjuvant* (not included) must be added at 1.0 L per 100 L of spray solution.**

Refer to the product label for complete mixing instructions. A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Minimum 22 L per acre.

Nozzles and Pressure: 30 to 40 psi (210 to 275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to wheat, or barley that are stressed by severe weather conditions (frost, drought or water saturated soil) as crop injury may result. Under certain conditions (heavy rainfall, prolonged cool weather, frost conditions, wide fluctuations in day/night temperatures) lightening in crop colour and reduction in crop height may occur.

Group 2 susceptible kochia control may be reduced during stress conditions or if extremely heavy infestations exist.

Tank Mixes:

Herbicides: None registered.
Fertilizers: None registered. DO NOT mix with substances that contain boron or that release chlorine.

Note: The above mixes are those listed on the *Triton C* label only.

E.I.duPont also supports the following mixes that are not on the *Refine SG* label. Mixes must be applied according to the most restrictive use limitations for either product:

Herbicides: *Axial BIA, Axial BIA + MCPA ester, Flucarbazone 2.0, Flucarbazone 2.0 + 2,4-D, Horizon NG, Puma Advance.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 6 hours may reduce control in general.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: Must not be grazed or fed to livestock for 77 days after treatment.

Preharvest Interval: Leave 77 days between treatment and harvest for wheat and durum and 80 days for barley.

Re-cropping: Spring wheat (including durum) and spring barley may be reseeded immediately following application. Wheat, barley, oat, canola, field pea, flax, lentil and sunflower may be grown the year after application. On low organic matter soils or under dry conditions, flax and lentils should NOT be grown until the second year after application. DO NOT use *Triton C* on land where potato or vegetables are grown. A field bioassay (a test strip grown to maturity) must be conducted the year before growing any crops other than those listed above.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	0	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Triton C can cause severe injury to sensitive crops at very low concentrations. Sprayers should be flushed out immediately if application is to be stopped for an extended period. The manufacturer recommends a cleanout procedure similar to 'Method A' in the general sprayer cleaning section on page 15 to 16. See label for specific process.

Hazard Rating:

Caution – Poison

Warning – Eye and Skin Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Triton K

Herbicide Group
2 - tribenuron
4 - dicamba, 2,4-D
(Refer to page 45)

Company:

E. I. duPont Canada

Formulation:

The *Triton K* package contains the following components:

DB-858 **(PCP#28872);** ***Triton Broadleaf*** **(PCP# 29989):** 58.45% dicamba sodium salt, and 8.25% tribenuron methyl formulated as a water dispersible granule.
Container size - 1.47 kg

2,4-D LV 700 **(PCP#23192):** 660 g/L 2,4-D **ester formulated** as an emulsifiable concentrate.

Crops and Staging:

Spring wheat (including durum), winter wheat and barley:

3 leaves fully expanded to 6 leaves plus 3 tillers. Application outside of this stage range can result in injury to the crop.

Fallow: Stage according to weeds.

Weeds and Staging:

Weeds controlled up to 10 cm tall or across:

Annual sunflower
Ball mustard
Canada thistle (top growth control)
Cow cockle
Dandelion ***
Flixweed**
Hare's-ear mustard
Indian mustard
Kochia (2 to 10 leaf)†
Lamb's-quarters
Narrow-leaved hawk's-**beard****
Prickly lettuce
Redroot pigweed
Russian pigweed
Russian thistle
Shepherd's-purse**
Stinkweed**
Sweet clover
Thyme-leaved spurge
Tumble mustard
Wild buckwheat*
Wild mustard
Wild radish
Wormseed mustard

* **1 to 4 leaf stage**
** **Fall rosettes and spring seedlings only.**
*** **Spring or fall rosettes up to 15 cm in diameter.**

Rate:

***DB-858/Triton Broadleaf*:** 36.8 g per acre

***2,4-D 700 LV ester*:** 243 mL per acre

(One package treats 40 acres or 16 ha)

Apply this product or other products containing the same ingredients only once per season.

Triton K may degrade if left in the sprayer for an extended period of time. Apply with in 24 hours of first mixing. Refer to the product label for complete mixing instructions.

A general guide to mixing can be found on page 14.

Application Information:

DO NOT apply if temperatures are greater than 30°C, if humidity is high, or wind is blowing toward non-target plants as injury from drift may result.

Water Volume: Minimum 22 L per acre.

Nozzles and Pressure: Maximum 40 psi (275 kPa) when using conventional flat fan nozzles. **Low drift nozzles may require higher pressures for proper performance.** Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE coarse*** **droplets.** Use a 50 mesh or coarser screen and filter system

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to wheat, or barley that are stressed by severe weather conditions (frost, drought or water saturated soil) **as crop injury may result. Under certain conditions** (heavy rainfall, prolonged cool weather, frost conditions, **wide fluctuations in day/night temperatures) lightening in** crop colour and reduction in crop height may occur.

Kochia control may be reduced during stress conditions or if extremely heavy infestations exist.

Tank Mixes:

None registered.

E.I. duPont Canada supports the following mixes that are not on the *Triton K* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Flucarbazone 2.0, Puma Advance* (206 mL per acre).

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 4 to 6 hours may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: Lactating dairy animals MUST NOT graze fields with 7 days of treatment.

Preharvest Interval: Leave 30 days between application and harvest.

Re-cropping: No restrictions the year following application.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. May be frozen.

Buffer Zones:

CROP	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Cereals	1	0	4
Fallow	1	1	15

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance is measured from the downwind edge of the boom to sensitive areas.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

Triton K can cause severe injury to sensitive crops at very low concentrations. Sprayers used to spray this product should be flushed out immediately after use. The manufacturer recommends a process similar to 'Method A' in the general section on sprayer cleaning on page 15 to 16. See label for specific instructions.

Hazard Rating:

☠ Caution - Poison

⚠ **Warning – Eye and Skin Irritant**
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Trophy **(This referring text to be removed in the 2018 edition)**

See fluroxypyr + MCPA on page 187.

Tundra

Herbicide Group

1 - fenoxaprop
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Bayer CropScience (PCP#29367)

Formulation:

46 g/L of fenoxaprop-p-ethyl, 87.5 g/L of bromoxynil and 15.5 g/L of pyrasulfotole formulated as an emulsifiable concentrate.
Container size - 8.1 L, 129.6 L, 405 L.

Crops and Staging:

Application beyond the maximum rates provided below may result in crop injury.

CROP	STAGE
Barley, Spring wheat (including durum)	1 to 6 leaves on the main stem plus 3 tillers

Weeds, Rates and Staging:

Apply 0.81 L per acre (one 8.1 L container treats 10 acres) to control:

Grass weeds from the 1 to 6 leaf stage up to emergence of 3rd tiller:

Barnyard grass
Foxtail (green and yellow)
Wild oat

Apply at the 3 to 4 leaf stage for optimum control. Optimum weed control and yield response occurs when weeds are removed before tillering.

Broadleaf weeds from the 1 to 6 leaf stage unless otherwise indicated:

Canada fleabane (up to 10 cm)*
Canada thistle† (up to 30 cm)
Chickweed
Cleavers (1 to 3 whorls)
Cleavers (4 to 6 whorls)*
Dandelion† (up to 25 cm across††)
Flixweed (up to 10 cm)
Hemp nettle
Kochia (up to 10 cm)
Lamb's-quarters
Narrow-leaved hawk's-beard (up to 10 cm and before bolting)
Pale smartweed
Ragweed (Common)
Redroot pigweed
Round-leaved mallow†
Russian thistle (up to 10 cm)
Shepherd's-purse
Sow-thistle (annual, perennial†)
Stinkweed
Stork's-bill (up to 8 leaf)***
Volunteer canola**
Wild buckwheat
Wild mustard

† Suppression only

†† Spring seedlings and over-wintered rosettes.

* **Add 200 g of active ammonium sulfate per acre (202 g per acre of 99% dry; 0.5 L / acre of 40% liquid; or 0.4 L per** acre of 49% solution).

** **Including all herbicide tolerant varieties.**

*** **Only when mixed with** *2,4-D ester* and ammonium sulphate.

DO NOT apply *Tundra* or other products containing fenoxaprop, pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

Water Volume:
Ground: 18.9 L per acre. Use higher water volumes for dense crop/weed canopies.
Aerial: 11.4 L per acre.

Nozzles and Pressure: Use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium classification*** droplets. Low drift nozzles may require higher pressures for proper performance.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Crop injury may result if applied to a crop that is stressed by severe weather conditions, frost, low fertility, drought, water saturated soil, disease or insect damage. Weeds growing under adverse environmental conditions such as drought will be less susceptible to *Tundra*. **Under stressed conditions and/or heavy crop canopy, early application** will result in improved weed control.

Tank Mixes:

Herbicides: *2,4-D ester* (113 g ae/acre) + ammonium sulphate (see Rates:)

Fungicides: None registered.

Insecticides: None registered.

Fertilizers: DO NOT mix with fertilizers other than those indicated above.

Bayer also supports the following mixes that are not on the *Tundra* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Lontrel, MCPA Ester + ammonium sulphate.*

Fungicides: *Tilt*

Insecticides: *Decis, Sevin XLR.*

Adding ingredients in the correct order is critical for optimum performance. Check labels of both products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT enter treated areas for 24 hours.

Grazing: DO NOT graze or cut cereal crops for hay, within 25 days of application.

Preharvest Interval: Leave 65 days from application to harvest.

Re-cropping: Alfalfa, barley, canaryseed, canola, corn (Manitoba only), flax, oat, potato, soybean (Manitoba only), sunflower, tomato (Manitoba only), and wheat (spring, and durum) may be planted the season following application. Field pea may be grown the following year in all black, grey-wooded and dark brown soil zones. DO NOT plant field pea the season following *Tundra* use in the brown soil zone where organic matter content is below 2.5 % and **where soil pH is above 7.5. Lentil may be seeded the second** season following application.

Aerial Application: May be applied by air.

Storage: Store in a dry controlled temperature facility. DO NOT freeze. Shake before using if stored for longer than one year.

Buffer Zones:

Application method	Buffer Zones (metres †) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	3	1	10
Fixed wing aircraft	20	5	375
Helicopter	20	3	225

See page 36 for an explanation of the different habitats.

[*] **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on tank mixing on page 15 to 16.

Hazard Rating:

Caution - Poison

Danger - Corrosive to eyes and skin.
Potential skin sensitizer.

Warning - Eye Irritant.

For an explanation of the symbols used here see page 11.

Ultim* (For use in the Red River Valley of Manitoba only)

Herbicide Group

2 - rimsulfuron & nicosulfuron

(Refer to page 45)

Company:

E. I. duPont Canada (PCP#24736)

Formulation:

37.5% rimsulfuron and 37.5% nicosulfuron formulated as a water dispersible granule.
Container sizes - 134.8 g (4 x 33.7 g water soluble bags).

Crops and Staging*:

Field corn hybrids at the 1 to 4 leaf stage:

Note: Corn hybrids with ratings of less than 2500 corn heat units may be sensitive to *Ultim.* Check with seed supplier prior to applying to ensure the hybrid has known tolerance to Group 2 herbicides.

NOTE - Since applications to corn in Manitoba has been registered under the User Requested Minor Use program, the manufacturer assumes no responsibility for herbicide performance.* ***Application to corn is at the risk of the user.*

Weeds and Staging:

CROP	STAGE
Wild oats	3 to 6 leaf
Foxtail (green and yellow*), barnyard grass, volunteer cereals	1 to 6 leaf (up to 2 tillers)
Quackgrass	3 to 6 leaf stage (with extended leaf 4 to 8 inches long)
Redroot pigweed	2 to 6 leaf
Volunteer canola**	**Emergence to 5 leaf stage**

Contact the manufacturer for additional weeds not listed on the label.

* Suppression only.

** Not Clearfield varieties.

Rates:

13.5 g per acre.

One water soluble bag of *Ultim* will treat 2.5 acres (10 acres per container).

Add a non-ionic surfactant (*AgSurf II, Agral 90, Citowett Plus*) at 0.2 L per 100 L of spray solution.

Apply *Ultim* within 24 hours of mixing, as product degradation may occur resulting in reduced weed control. Refer to the product label for complete mixing instructions.

Application Information:

Water Volume: Minimum 40 L per acre; for best results apply 56 to 77 L per acre.

Nozzles and Pressure: No pressures listed on label when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage of ***ASABE medium*** droplets. Use a 50 mesh or coarser screen and filter system.

Effects of Growing Conditions:

Rapid fluctuations in temperature (greater than 20°C difference within 24 to 36 hours) will stress the corn crop. For maximum crop safety, allow 48 to 72 hours for the corn to acclimatize before applying *Ultim*.

Apply ONLY when the temperature in the 24 hours before AND after application is between 5°C and 28°C. Temperatures beyond this range increase the potential for crop injury. Separate applications of *Ultim* herbicide followed by a broadleaf herbicide (minimum 12 hours later) will reduce the potential for injury.

WARNING: Crop injury may result if application is made to corn that has been stressed by abnormally hot, humid or cold weather conditions, frost, low fertility, drought, water saturated soil, compacted soil, previous pesticide applications, disease or insect damage. If corn has been injured by frost, wait 48 to 72 hours before applying *Ultim*.

Tank Mixes:

Herbicides: None registered.

Insecticides: None registered. *Ultim* ***should NOT*** be applied to corn that has been treated with *Lorsban*. Leave 7 days between the application of *Ultim* and that of a foliar organophosphate insecticide.

Fungicides: None registered.

Note: The above mixes are those listed on the *Ultim* label only. E.I duPont also supports the following mixes that are not on the *Ultim* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: Glyphosate at registered rates in glyphosate tolerant corn.

Restrictions:

Rainfall: Within 2 to 4 hours may reduce control.

Re-entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze treated crops or cut for hay.

Preharvest: Leave 30 days from application to harvest.

Re-cropping: Field corn, winter wheat and spring barley may be planted the year following application. Perform a field bioassay before planting any other crops, or where *Ultim* is more persistent (sandy soils, with low organic matter and pH greater than 7).

Aerial Application: DO NOT apply by air.

Storage: Store product in original containers in a secure, dry area, away from other pesticides, food, or feed.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground only*	1	1	5

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

The manufacturer recommends a cleanout process similar to 'Method A' in the general section on sprayer cleaning on page 15 to 16. See the label for specific instructions.

For additional information, Refer to page 15.

Hazard Rating:

◇ **Warning – Eye Irritant.**

▽ Caution – Skin Irritant.

For an explanation of the symbols used here see page 11.

Varro

Herbicide Group
2 - thiencarbazone
(Refer to page 45)

Company:

Bayer CropScience (PCP# 29070)

Formulation:

10 g / L thiencarbazone-methyl formulated as a suspension concentrate.

Container size - 2 x 8 L.

Crops and Staging:

Spring wheat (including durum):
1 to 6 main stem leaf stage to a maximum of 3 tillers, and before the first node can be felt in the stem. DO NOT apply beyond 35 days of emergence.

Winter wheat:
Spring or fall application from 1 to 6 main stem leaf stage and before the first node can be felt in the stem.

DO NOT apply after the presence of the first node as crop injury may occur.

Weeds and Staging:

Grass weeds controlled from 1 to 6 main stem leaves and prior to the emergence of the 3rd tiller unless otherwise indicated:

Barnyard grass
Foxtail (green and yellow†)
Japanese brome† **
Persian darnel†
Volunteer Canaryseed *
Wild oats

Broadleaf weeds controlled at the 1 to 6 leaf stage unless otherwise indicated:

Cleavers (1 to 6 whorls)
Hemp nettle
Lamb's-quarters†
Pale smartweed
Pigweed, redroot
Round leaved mallow†
Russian thistle (up to 10 cm)†
Shepherd's purse
Stinkweed
Volunteer canola (except Clearfield varieties)
Wild buckwheat
Wild mustard

* Up to the emergence of the 2nd tiller.
** Prior to tillering.
† Suppression only.

Rates:

0.2 L per acre

(One 8 L container will treat 40 acres)

Add ammonium sulphate on spring wheat only for improved weed control. Add 200 g active ammonium sulphate per acre (202 g / acre of 99% dry; 0.5 L / acre of 40% liquid or 0.4 L / acre of 49% solution) to the tank before adding other components.

DO NOT add ammonium sulphate to applications on durum wheat.

For improved weed control in durum wheat add either *Agral 90* or *AgSurf* at 0.2L per 100 L.

Application Information:

Water Volume:
Ground: 20 to 40 L per acre. Use higher water volumes for dense canopies.
Aerial: Minimum 11.3 L per acre.

Nozzles and Pressure:
Ground: For conventional flat fan nozzles use a pressure of 30 to 50 PSI (207 to 345 kPa). Angle nozzles forward 45 degrees for better coverage. Low drift nozzles may require higher pressures for proper performance.

Aerial: Minimum 43 PSI (300 kPa).

For either ground or aerial, use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result. Under drought conditions DO NOT apply to spring or durum wheat if the time from seeding to spraying exceeds 35 days or if temperatures will be 3°C or lower within 3 days of application (before or after).

Tank Mixes:

Add ammonium sulphate to the tank first then *Varro* then the tank mix partner.

Herbicides:

Wheat (including Spring, durum, winter):

Infinity (0.33 L / acre)
Thumper (0.4 L / acre)

Spring Wheat (including durum):

2,4-D ester (129 g ae / acre)
Buctril M (0.4 L / acre)
MCPA ester (0.23 L / acre – 600 g / L form)

Spring Wheat (NOT including durum):

Curtail M (0.61 L / acre)*
Refine SG (12 g / acre)
Refine SG + 2,4-D ester (rates above)
Refine SG + MCPA ester (rates above)

Fungicides: None registered.
Insecticides: None registered.
Fertilizers: None registered.

Note: The above mixes are those listed on the *Varro* label only.

Bayer CropScience also supports the following mixes on spring wheat and durum that are not on the *Varro* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Attain XC, Barricade II, Momentum, OcTTain, Prestige XC*, Retain SG, Stellar*

Fungicides: *Tilt.*

* When tank-mixing *Varro* with *Prestige XC* or *Curtail M* in spring wheat (NOT durum) always add ammonium sulphate.

Adding ingredients in the correct order is critical for optimum performance. Check labels of products to be mixed for directions. General guidelines can be found on page 14.

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT enter treated field for 12 hours.

Grazing: Must not be grazed within 7 days or cut for livestock feed within 30 days of treatment.

Preharvest Interval: DO NOT harvest grain or straw within 60 days of application for spring and durum wheat or within 72 days of application to winter wheat.

Re-cropping: Alfalfa, barley, canaryseed, canola, chickpea, dry bean, field corn, flax, lentil, mustard, oat, pea, soybean, sunflower, timothy, and wheat (durum, spring) may be seeded the year following application.

Aerial Application: May be applied by air.

Storage: Store in a cool, dry place. Keep from freezing. Shake well before using.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	0	1
Fixed wing aircraft	1	0	30
Helicopter	1	0	30

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70% when using shrouds** and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general section on sprayer cleaning on page 15. If mixing with other pesticides, combine this method with the method indicated for the tank mix partner.

Hazard Rating:

Warning – Eye and Skin Irritant.

For an explanation of the symbols used here see page 11.

Velocity m3

Herbicide Group
2 - thiencarbazone
6 - bromoxynil
27 - pyrasulfotole
(Refer to page 45)

Company:

Bayer CropScience (PCP#29584)

Formulation:

5 g/L thiencarbazone-methyl, 31.3 g/L pyrasulfotole and 175 g/L bromoxynil formulated as a suspension concentrate
Container size - 8.1 L **and 129.6 L.**

Crops and Staging:

Spring wheat (including durum):
1 to 6 main stem leaf stage to a maximum of 3 tillers, and before the first node can be felt in the stem. DO NOT apply beyond 35 days of emergence.

Winter wheat:
Spring or fall from 1 to 6 leaf stage and before the first node can be felt in the stem.

DO NOT apply after the first node is detectable in the stem as crop injury may occur.

Weeds and Staging:

Grass weeds controlled from 1 to 6 main stem leaves and prior to the emergence of the 3rd tiller:

Barnyard grass
Foxtail (green and yellow†)
Canaryseed
Persian darnel†
Wild oat
Japanese brome†

Broadleaf weeds controlled at the 1 to 6 leaf stage unless otherwise indicated:

Canada fleabane (seedlings **1 to 10 cm**)*
Canada thistle (up to 30 cm)†
Common chickweed
Cleavers (1 to 3 whorls)
Cleavers (4 to 6 whorls)*
Dandelion (up to 25 cm diameter)†
Flixweed (up to 10 cm)
Hemp-nettle
Kochia (up to 10 cm)
Lamb's-quarters
Narrow-leaved hawk's-beard (up to 10 cm and prior to bolting)
Pale smartweed
Pigweed, redroot
Ragweed (common, giant†*)
Round-leaved mallow
Russian thistle (up to 10 cm)
Shepherd's-purse
Sow-thistle (annual, perennial†)
Spreading atriplex (1 to 10 leaf)†*
Stinkweed
Stork's-bill (1 to 8 leaf)**
Volunteer canola (all varieties)
Wild buckwheat
Wild mustard

† Suppression only.
* **Add ammonium sulphate as per the "Rates": section** below.
** **Only when mixed with 2,4-D ester + ammonium sulphate** (see Tank Mixes).

Rates:

0.405 **L per acre**

(One 8.1 **L container treats** 20 **acres,** 129.6 **L drum will treat** 320 acres)

Add ammonium sulphate on **spring wheat only** for improved weed control or when tank mixing with *2,4-D* or *MCPA*. **Add** 200 **g active ammonium sulphate** (202 **g/acre of** 99% **dry;** 0.5 **L/acre of** 40% **liquid or** 0.4 **L/acre of** 49% **liquid). If using an ammonium sulphate product with a different** concentration, adjust the rate accordingly.

DO NOT add ammonium sulphate to applications on durum wheat.

DO NOT apply *Velocity m3* or other products containing thiencarbazone, pyrasulfotole or bromoxynil more than once in the same year.

Application Information:

Water Volume:

Ground: 20 to 40 L per acre. Use higher water volumes for dense canopies.

Aerial: Minimum 11.4 L per acre.

Nozzles and Pressure:

Ground: For conventional flat fan nozzles use a pressure of 30 to 50 PSI (207 to 345 kPa). Angle nozzles forward 45 degrees for better coverage. Low drift nozzles may require higher pressures for proper performance.

Aerial: Minimum 43 PSI (300 kPa).

For either ground or aerial, use a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

DO NOT apply to crops or weeds that are stressed (frost, low fertility, drought or flooding, disease or insect damage) as crop injury or reduced weed control may result.

DO NOT apply to spring or durum wheat under conditions where the time from seeding to spraying exceeds 35 days or if temperatures will be 3°C or lower within 3 days of application (before or after).

Tank Mixes:

Herbicides: *2,4-D ester* (113 g ae/acre) + ammonium sulphate* (see Rates:).

*add ammonium sulphate on spring wheat (NOT durum) only.

***Bayer* supports the following mixes that are not on the *Velocity m3* label. Apply mixes according to the most restrictive use limitations for either product:**

Herbicides: *Lontrel, MCPA Ester** (94.5 to 189 mL - 600 g/L forms).

* When adding *MCPA Ester* to *Velocity m3* tank mix, ammonium sulphate must be added for application to spring wheat only. (see Rates section above).

Fungicides: *Tilt*

Insecticides: *Decis, Sevin XLR.*

Restrictions:

Rainfall: Within 1 hour may reduce control.

Re-Entry: DO NOT enter treated field for 24 hours.

Preharvest: DO NOT harvest grain or straw within 60 days of application to spring and durum wheat or within 72 days of application to winter wheat.

Grazing: Must not be cut for livestock feed within 30 days or grazed by livestock within 25 days of treating the crop.

Re-cropping: Alfalfa, barley, canaryseed, canola, field corn (Manitoba only), flax, soybean (Manitoba only), tame oat, and wheat (durum, spring) may be seeded the year following application. Field pea may be grown the following year in all black, grey wooded and dark brown soil zones. DO NOT plant field pea the season following *Velocity m3* use in the brown soil zone where organic matter content is below 2.5 % and where soil pH is above 7.5. Lentil may be seeded the second season after application.

Aerial Application: May be applied by air.

Storage: Store in a cool, dry place. Keep from freezing. This product is combustible. DO NOT store near heat or open flame.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5
Fixed wing airplane	10	1	375
Helicopter	10	1	225

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Sprayer Cleaning:

Refer to 'Method A' in the general sprayer cleaning section on page 15 to 16.

Hazard Rating:

Velocity m3 All-In-One:

Warning – Poison

Danger – Corrosive to eyes.
Skin Irritant
Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Velpar DF CU

Herbicide Group
5 - hexazinone
(Refer to page 45)

Company:

Tessenderlo Kerley Inc. (PCP#25225)

Formulation:

75% hexazinone formulated as a water dispersible granule Container size - 2 kg.

Crops and Staging:

Established alfalfa for forage and seed. Apply in late fall prior to freeze-up when alfalfa is dormant or in early spring before alfalfa growth resumes. Apply only on alfalfa that has been established for 18 months or longer. If burning or irrigation is to be carried out, do not apply until these operations have been completed.

NOTE: DO NOT apply to frozen ground. DO NOT apply to soils with less than 1% organic matter. DO NOT apply to gravelly or rocky soils, exposed subsoils or sand. Crop injury may occur in fields where alfalfa root growth has been restricted by hard pans or other physical barriers to root growth.

Weeds, Rates and Staging:

Application stage is dictated by the crop above.

Apply a minimum of 0.272 kg per acre to control:

Dandelion
Sow-thistle
Quackgrass

Apply 0.544 kg per acre to control:
The weeds above plus:

Narrow-leaved hawk's-beard
Scentless chamomile

Use the lower rate on medium-textured soils with low organic matter.

Application Information:

Water Volume: 81 L per acre.

Nozzles and Pressure: 30 to 40 psi (200 to 275 kPa) **when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a** combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE medium*** droplets.

How it Works:

Refer to Table 2 on page 47.

Effects of Growing Conditions:

Adequate soil moisture is required for activation of the product.

Tank Mixes:

None registered.

Restrictions:

Rainfall: Rainfall is beneficial for activation of the product.

Re-Entry: DO NOT re-enter treated fields for 48 hours.

Grazing: Leave 30 days between application and grazing harvesting for feed (hay or greenfeed).

Re-cropping: **Leave 2 years of between treating alfalfa and the seeding of a crop. A field bioassay is required after** 2 years to determine which crops are safe to grow.

Aerial Application: DO NOT apply by air.

Storage: May be frozen.

Buffer Zones:

Application method	Buffer Zones (metres†) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	1	1	5

See page 36 for an explanation of the different habitats.

* **Buffer zones can be reduced by 70%** when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Handheld or backpack sprayers do not require a buffer zone.

Sprayer Cleaning:

No specific cleaning procedures are indicated on the label. **Based on products with similar chemistry, 'Method B' found** in the general sprayer cleaning section on page 15 to 16 or a commercial spray sprayer cleaning product, may provide **adequate cleaning. Contact the manufacturer for more information.**

Hazard Rating:

Danger - Corrosive to eyes.

Caution - Poison

Caution - Skin Irritant

For an explanation of the symbols used here see page 11.

Viper ADV

Herbicide Group
2 - imazamox
6 - bentazon
(Refer to page 45)

Company:

BASF Canada (PCP#30626)

Formulation:

20 g/L imazamox and 429 g/L bentazon formulated as a solution.

Container size - 2 x 8.1 L, 129 L.

Requires the addition of:

BASF 28% UAN (28-0-0) is required, but sold separately.

Container size - 2 x (2 x 8 Liters); 128 L drums.

Crops and Staging:

Field pea: 3 to 6 above-ground nodes (3 to 6 true leaves).

Dry bean (black, cranberry, great northern, navy, pinto, pink, red Mexican): *Viper ADV* plus additional *Basagran Forte* (see tank mix section) from the fully expanded first trifoliate leaf to the second trifoliate fully expanded.

Even though *Viper ADV* is registered for all the dry bean types above, tolerance may vary between varieties (esp. navy). Test new varieties on a small area for tolerance before widespread use.

Soybean: Emergence to 3 expanded trifoliate leaves.

Established clover (alsike, red) for seed production only: Apply prior to flowering but before the crop canopy closes.

Note: Applications under hot, humid conditions may result in temporary leaf yellowing, leaf flecking, bronzing or burning. The crop usually outgrows this condition within 10 days and new tissues will not be affected.

Weeds and Staging:

Grasses - 1 to 4 main stem leaves or until early tillering.

Barnyard grass
Green foxtail
Japanese brome*
Persian darnel
Volunteer barley
Volunteer canaryseed
Tame oat
Volunteer wheat (including durum, not CLEARFIELD varieties)
Wild oat
Yellow foxtail

Broadleaf Weeds - cotyledon to 4 leaf stage.

Cleavers*†
Cow cockle
Green smartweed
Kochia*†
Lamb's–quarters
Pigweed (prostrate††*, redroot)
Pigweed (prostrate††*, redroot)
Round-leaved mallow*
Russian thistle
Shepherd's-purse
Stinkweed
Sow thistle (spiny annual)††*
Stork's-bill††*
Volunteer canola (including CLEARFIELD varieties)
Volunteer lentils (including CLEARFIELD lentils)
Wild buckwheat*
Wild mustard†

* Suppression only.
† Including Group 2 resistant biotypes.
†† *Viper ADV + Basagran Forte* in dry beans only.

Rates:

400 mL per acre

(One case of *Viper ADV* treats 40 acres)

Add ***28 % BASF UAN*** (sold separately) at 0.81 L per acre.

Failure to include UAN will result in significantly reduced product performance.

DO NOT use any other adjuvants as injury may result.

DO NOT apply *Viper ADV* more than once or follow *Viper ADV* with any related products (*Basagran, Odyssey, Solo*) in the same year.

DO NOT apply to any crop other than those registered as severe injury will result.

Refer to the product label for complete mixing instructions for this product.

A general guide to mixing can be found on page 14.

Application Information:

Water Volume: Apply in 40 L per acre.

High water volumes are required for adequate coverage, particularly when weed densities are high or weed staging is large.

Nozzles and Pressure: Use 40 psi (275 kPa) when using conventional flat fan nozzles. Low drift nozzles may require higher pressures for proper performance. Use a combination of nozzles and pressure designed to deliver thorough, even coverage a of ***ASABE medium*** droplets. Use 50 mesh (or coarser) filter screens.

Effects of Growing Conditions:

DO NOT spray if temperatures of +5°C or less are forecast within 3 days of application. Under cool or dry conditions, control of some weeds may be severely reduced. DO NOT apply to crops stressed from hail damage, flooding, drought, hot, humid weather, widely fluctuating temperatures, prolonged cold or injury from previous herbicides, as crop injury may result.

Tank Mixes:

Dry bean (types above):

Basagran Forte (145 mL / acre) plus UAN as above.

Restrictions:

Rainfall: Rain within 6 hours may reduce control.

Re-Entry: DO NOT enter treated fields for at least 12 hours.

Grazing: DO NOT graze or cut for feed.

Preharvest Interval: DO NOT apply within 60 days of harvest.

Re-cropping: Winter wheat may be seeded 3 months after application. Barley, canaryseed, canola, chickpea, field corn, field pea, flax, lentil, oat, sunflower, and spring wheat (including durum) may be seeded the first season after application and tame mustard (condiment types only) the second season after application. The company recommends that a field bioassay (a test strip grown to maturity) be conducted the year before growing any crops other than those listed above. Contact manufacturer for additional information on recropping intervals.

Aerial Application: DO NOT apply by air.

Storage: DO NOT freeze. Store in a cool, dry place above 5°C.

Buffer Zones: Avoid spraying in situations where drift may occur. Leave at least 11 metres between the outside edge of the sprayed area and sensitive non-target areas such as shelterbelts, hedgerows, wetlands, woodlots, vegetated ditch banks, ponds, streams, and sloughs.

Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

Sprayer Cleaning:

Refer to 'Method B' in the general sprayer cleaning section on page 15.

Hazard Rating:

Warning – Poison

Danger – Corrosive to eyes (*Viper B* only).

Warning – Contains the allergen soy.

Warning – Eye and Skin Irritant.

For an explanation of the symbols used here see page 11.

Plant Disease Control

Integrated Plant Disease Management

Cereal Leaf Diseases

Cereal leaf diseases affect both the yield and quality of cereals. The following management practices are recommended for effective control of leaf diseases in all cereal crops.

Scouting: Scout fields prior to, during, and following flag leaf emergence to check for disease levels. Flag and upper leaves are responsible for 50 per cent or more of grain-fill.

Crop Rotation: Rotate crop types [e.g. cereal (wheat)/ oilseed / cereal(barley)/ pulse] to reduce the build-up of disease inoculum in crop residue. If at all possible, do not seed the same crop in back to back years. When a short rotation is absolutely necessary, seed in the second year a variety that is more resistant to an anticipated disease problem.

Resistant Varieties: Provincial crop / seed guides provide a comprehensive listing of the performance of adapted varieties, including their resistance status to specific diseases.

Foliar Fungicides: Foliar fungicides, applied at the proper time in accordance to manufacturers' Pesticide Product labels, can control cereal leaf diseases and help to attain target yields. The greatest benefit occurs when disease pressure is high or with varieties that have poor resistance.

Spraying Practices: Foliar fungicides should be applied preventively, before disease is well-established in a crop and already causing crop loss. Good spray coverage with minimal drift is essential. Ideally, the best time to spray is when the wind is light, humidity is above 60 per cent and air temperature is between 10 and 25°C.

Ergot of Cereals

Ergot is a fungal disease that affects most cereals and grasses in Canada. Ergot bodies contain toxic alkaloids; they should never be consumed by humans or fed to animals. Ergot is a particularly damaging disease of rye, and has also been observed sporadically over the years on cereals and grasses in the prairie provinces. After an ergot outbreak, crop residue and soil become contaminated with a higher load of ergot bodies, placing nearby grasses and cereal crops at greater risk of infection in the following seasons. This risk increases further when cool, moist weather conditions promote ergot spore production and / or when cereals experience an extended period of flowering or an induction of floret sterility due to any of a variety of agronomic or environmental factors. Once ergot is present, little can be done to control the disease in the field, so prevention is important. Planting seed contaminated with ergot bodies can potentially spread disease to previously clean fields and there are no seed treatments registered; therefore only clean, healthy seed should be used. During the field season, nearby grasses may be mowed to remove additional hosts. Prior to harvest, fields should be scouted to determine where ergot has developed, such as headlands, and those areas should be harvested separately. Viability of ergot bodies decreases after one to two years.

Fusarium Head Blight of Cereals

Fusarium head blight (FHB) causes a reduction in yield as a result of floret sterility and the loss of light weight cereal kernels during combining. More important is the effect on grain quality and food safety due to production of mycotoxins, including deoxynivalenol (DON) and vomitoxins. In Manitoba, FHB occurs throughout all crop regions and will damage wheat crops whenever environmental conditions favour the disease. In Saskatchewan, FHB has been established in eastern regions for several years, but occurs across the province, particularly in wet years.

Field Management of FHB: Weather is by far the greatest factor in development of FHB. The disease is most likely to develop when the plants are flowering, temperatures range from 15 to 30°C and high moisture is continuous for 48 to 60 hours. If conditions remain warm and moist, the pathogen can continue to sporulate and spread to other kernels or heads. Under these optimum conditions, crop management has little impact on FHB outbreaks. Production practices, which lead to reduced tillering and shortened flowering duration, could reduce the risk period of FHB infection.

Crop Rotation and Crop Selection: A break of at least one year – preferably two years – is advised between cereal, grass and corn production. In fields of wheat on wheat stubble, the incidence of FHB was about one and a half times higher than in fields of wheat planted into pulse crop residue. Regardless of the rotation, producers should consider planting cereals that are less susceptible to FHB. Results from previous years show that durum and soft white wheat varieties are more susceptible than hard red spring wheat varieties. Barley is more resistant than wheat, and oat is more resistant than either wheat or barley. Refer to provincial seed guides for FHB disease ratings for each variety. Planting two or more varieties of wheat with differing flowering times or varying planting dates will help reduce the risk of infection. Susceptible crops should not be planted on infected corn stubble. Corn trash is slower to decompose than cereal trash, and acts as a source of inoculum for a much longer time period.

Late Blight of Potatoes

One of the major threats to Manitoba and Saskatchewan's potato industry is the fungal disease late blight. At present, there is no fungicide registered for use on potatoes that is capable of eradicating the fungus from infected plants. As a result, producers are forced to adopt preventive management to control this disease. One of the main components of this strategy is the application of fungicides at specified spray intervals. This interval varies with the type of fungicide used. Shortening or lengthening of this interval should be based on current weather conditions and the status of the disease in the crop.

In Manitoba, potato producers can make use of a weather-based late blight risk forecasting program. The purpose of this program is to predict when environmental conditions are most conducive to disease development and issue warnings based on those parameters.

Accurate weather monitoring and scouting techniques are very important for achieving the most effective use of fungicides. Combining precise weather forecasting with spray interval scheduling may lower input costs for the farmer and lead to a more productive, higher quality crop. These weather monitoring systems monitor key environmental variables, such as relative humidity, temperature, leaf wetness and precipitation.

The following practices are recommended for effective disease management:

Scouting: To effectively schedule preventative fungicide applications and eliminate unnecessary fungicide use, local weather forecasts should be used to identify conditions conducive to disease development. Scout fields regularly to identify diseases and pests that may be developing. Low areas in rolling or hilly fields and in wind-protected area near trees lines should be specially checked.

Crop Varieties: *(There are no known commercial resistant varieties currently available in Canada).* Where practical, the use of short season varieties may help reduce the period of use for fungicides.

Healthy Seed: Obtain seed from sources with effective disease management practices. The use of certified seed is legislated in Manitoba and Saskatchewan. Grade seed carefully while cutting and discard suspicious looking tubers and seed pieces.

Cull Clean-up: Avoid leaving tubers, including debris or slivers from seed cutting, in cull piles for any length of time. Follow a program of sanitation for storage facilities and equipment to eliminate sources of the disease. Dispose of cull piles in an approved manner so they do not serve as a source of disease inoculum for future infections. Dispose by burying, using a cover, spreading out on the field over winter, or feeding to livestock.

Sanitation: Follow a program of sanitation for storage facilities and equipment to eliminate sources of disease. Sanitation consists of cleaning and disinfecting all equipment, storage, and tools that contact potatoes from seeding through harvest and storage. Since most disinfectants are inactivated by soil and plant debris, it is essential that equipment and storage is thoroughly cleaned with a pressure washer or steam cleaner with detergent before disinfectant is applied. Treated surfaces should remain wet for at least 20 minutes for the disinfectant to destroy disease organisms.

Cultural Practices and Rotation: Use proper cultural practices including a one in four year potato crop rotation; proper hilling to reduce disease and greening in tubers; manage irrigation to avoid an excess or deficit of soil moisture; schedule irrigation throughout the day so it is not extending the natural dew period and prolonging leaf wetness; if late blight is discovered destroy hot spots of infected fields; control weed hosts (especially nightshades) and remove and destroy volunteer potatoes. Use appropriate weed control practices in rotational crops to control those weeds that may be hosts of diseases in potatoes.

Foliar Fungicides: Preventative fungicide applications are most effective in controlling late blight. Follow product label guidelines for most efficient and safe use of products. Labels of newly registered products also provide information on resistance management. In this context – medium to high risk of resistance fungicides (e.g. Group 7 - boscalid and Group 11 – stobilurins) should be rotated or mixed with low risk fungicides (e.g. mancozeb (M3) and chlorothalonil (M5)).

Farm Visits: The following recommendations are provided to prevent the spread of potato diseases from field to field or between farms. All people serving the potato industry should use these sanitary practices.

1. Contact the grower for permission to enter fields and other facilities on the farm.
2. Keep your vehicle clean and whenever possible, avoid driving your vehicle into fields or potato handling areas.
3. Carry a boot brush and a supply of disinfectant in your vehicle at all times. Quaternary ammonia (General Storage Disinfectant) is recommended as it is also registered for bacterial ring rot disinfection.
4. Wear coveralls or other protective outerwear that can be discarded or disinfected regularly.
5. Clean, washable, footwear is recommended and rubber boots are preferred.
6. Clean, wash, and disinfect your boots thoroughly on arrival at each field / farm / storage shed and before leaving.
7. Remove dirty outerwear, including boots before entering your vehicle.
8. Any tools to be used during the farm call (potato forks, shovels, soil probes, knives, etc) should be cleaned and disinfected before and after use.
9. Maintain a detailed logbook of field / farm / storage shed visits.

Canola Diseases

Sclerotinia stem rot has been one of the most prominent diseases affecting canola in Manitoba and Saskatchewan for the past 25 years. An important factor for disease development is environmental conditions. The disease is much more widespread and severe during wet years. Fungicide applications are an important element in controlling the development and spread of sclerotinia. Fungicide spray decisions are based on soil moisture, weather conditions, crop stage and density, and disease history. The sclerotinia resting bodies (sclerotia) require moist soil conditions for up to 10 days for germination to occur and the spore-bearing structures (apothecia) to form. Usually these conditions do not occur until the crop canopy closes. The spores released from the apothecia utilize the canola petals as a food source and fall into the canola canopy where they infect plants. Lesions form up and down the stem, wilting leaves and eventually killing the plant. Fungicide should be applied between the 20 to 50 per cent flower stages to protect the petals from being colonized by the spores.

Blackleg caused by *Leptosphaeria maculans* affects canola and most crucifer field and vegetable crops. After many years of low incidences, due to resistant canola varieties grown in the prairie provinces, the disease is gaining importance again. High frequency of canola in crop rotations, accompanied by changes in the pathogen populations, has led to higher incidences and severities in some fields. For an effective control, a 4 year crop rotation is highly recommended.

Clubroot is a soil-borne disease caused by a microbe, *Plasmodiophora brassicae*. Clubroot affects the roots of cruciferous field crops such as canola, mustard, and camelina, as well as cruciferous vegetables and weeds. Clubroot has become a significant problem for canola growers in some areas of Alberta and the pathogen has been detected in Saskatchewan and Manitoba. Clubroot is a regulated pest in Saskatchewan under *The Pest Control Act*. Currently there is no provincial legislation that regulates clubroot in Manitoba.

Invasion of the interior of the host roots alters hormone balance and leads to increased cell division and growth, resulting in clubroot galls. These deformed roots have a reduced ability to absorb water and nutrients leading to stunting, wilting, yellowing, premature ripening and shrivelling of seeds. The cause of these above-ground symptoms can be confirmed by digging up suspect plants to check roots for gall formation. Clubroot affects canola yield and quality to a similar degree as other diseases affecting water and nutrient uptake, and its impact depends on soil conditions and the growth stage of the crop when infection occurs. Spore germination, infection and disease development are favoured by warm soils, high soil moisture and low soil pH; however, the disease can still occur under conditions outside of the optimum parameters. Infected roots will eventually disintegrate, releasing resting spores into the soil, which may then be transported by wind, water erosion, animals/manure, shoes/clothing, vehicles/tires or earth tag on agricultural or industrial field equipment. Resting spore numbers will decline over time when non-host crops are grown, but a small proportion can survive in soil for up to 20 years. Clubroot is primarily a soil-borne disease; it does not infect seed but it may be found in soil attached to seed or other plant parts. There are currently no seed treatments or foliar fungicides registered for control of clubroot on canola. The following best practices are recommended for prevention and management of clubroot:

1. Plant susceptible crops, including resistant varieties, no more than once every four years. Although crop rotation will not prevent the introduction of clubroot to fields that are free of the pathogen, it will restrict clubroot development by limiting the increase of clubroot resting spores and preventing the increase of clubroot inoculum, as well as help alleviate the impact of other plant pathogens.
2. Scout crops regularly and carefully.
    - Identify suspicious above-ground symptoms including wilting, stunting, yellowing and premature ripening of canola or other susceptible crops.
    - Field entrances and approaches are likely to be contaminated with clubroot spores first. Therefore, symptoms will often appear there first.
    - Confirm cause of above ground symptoms by checking the roots for galls.
    - Send sample of symptomatic plants into a commercial lab for confirmation of diagnosis.
3. Practice good sanitation by restricting movement of potentially contaminated soil to non-contaminated regions.
    - For Saskatchewan and Manitoba producers, this means restricting entry into their fields of vehicles, field machinery or oil rig equipment with earth tag from infested regions unless it has been properly sanitized. Ask questions about where the equipment is from and what sanitation measures have been used before the equipment left the infested area, dealer or auction site.
    - Cleaning steps may include: removal of crop debris and soil, washing of equipment with a power washer using hot water or steam and misting with disinfectant (1-2 per cent bleach solution), followed by an additional rinse with water.
    - Other agricultural products, which could carry soil, should be carefully checked for excess soil and if possible be from clubroot free areas.

For more information on clubroot, visit www.clubroot.ca, www.agriculture.gov.sk.ca, or www.gov.mb.ca/agriculture.

Pulse Crop Diseases

There are a variety of pulse crops produced in Manitoba and Saskatchewan including field pea, field bean, lentil, chickpea and soybean. Pulse crops are adapted to different regions and will require unique agronomic and disease management practices. Some diseases will attack all pulse crops, e.g. sclerotinia (white mould) and seedling/root rots caused by *Aphanomyces euteiches*, *Pythium*, *Rhizoctonia*, *Fusarium* and *Botrytis* species. Some diseases may occur on more than one type of pulse crop, but the pathogen species infecting each is often specific to that crop. This is the case for the ascochyta blights, powdery mildews and anthracnose. It is important to source information on pulse disease control from grower organizations such as the Saskatchewan Pulse Growers (www.saskpulse.com), Manitoba Pulse Growers (www.manitobapulse.ca), provincial specialists, and field diagnostic guides. Most foliar diseases are favoured by warm, moist conditions and lush crop canopies, but root rots and powdery mildew can be present in dry years as well. In general, pulse disease management will need to include the following practices:

Use of clean seed and seed treatments: Plant certified seed or seed that has been tested at an accredited lab and known to have high germination and zero or acceptable levels of seed-borne disease. Seed treatments will help protect seed and seedlings from low levels of seedborne and soilborne pathogens. However, there are no seed treatments registered for control of *Aphanomyces euteiches*.

Crop Rotation: It is important to keep at least three years between the same type of pulse crop to allow for the breakdown of crop residue on which disease pathogens survive. Longer rotations may be required for *Aphanomyces euteiches*, due to long-lived resting spores in the soil. Since there are diseases that affect more than one type of pulse crop, it is still important to maintain at least two years between different pulse crops.

Crop Varieties with Disease Resistance: Refer to provincial seed guides for varieties adapted to your region. When available, choose varieties with disease resistance.

Scouting and Foliar Fungicide Application: Begin crop scouting at the vegetative stages for aggressive diseases such as ascochyta blight in chickpea. Scout for other foliar diseases at early bloom, e.g. ascochyta blight and anthracnose in lentil. It is too late to apply fungicide to control sclerotinia (white mould) once symptoms are observed, and/or the canopy has closed, so forecasting to determine risk is necessary.

Use foliar fungicides only when disease risk and potential loss are significant. Rotate fungicides or use tank mixes from different fungicide groups to prevent development of resistant pathogen populations.

Effects of Weather

Do not apply foliar fungicides during periods of dead calm or when winds are gusty. Avoid application immediately after a rainfall and delay spraying if rainfall is imminent. Contact fungicides are always more sensitive to wash-off by rainfall than systemic fungicides, because their mode of action relies on drying on the leaf surface. Failure of a contact fungicide to dry on the leaf surface may result in a loss in efficacy. Systemic fungicides are less sensitive than contact fungicides, but still need sufficient drying time and fully absorbed by plants prior to rainfall. Consult the label or product manufacturers for rainfast period for individual products.

Pathogen Resistance (Insensitivity) Management

Any fungal pathogen population may contain strains naturally insensitive to a fungicide and other fungicides within the same Group. A gradual or total loss of disease control may occur over time if these fungicides are used repeatedly in the same fields. Other resistance mechanisms that are not linked to site of action but specific for individual chemicals, such as enhanced metabolism, may also exist.

To delay fungicide resistance/insensitivity:

- Where possible, rotate the use of a fungicide, (and others within the same Group) with different Groups that control the same pathogens.
- Where possible, tank mix fungicides with a high risk of developing insensitivity with other fungicides from a different Group.
- DO NOT apply more than the maximum number of applications listed on the label. Avoid consecutive sprays of a fungicide, or other fungicides in the same Group, in a season.
- Fungicide use should be based on an integrated pest management (IPM) program that includes scouting and accurate recording related to pesticide use and crop rotation. An IPM program also considers cultural, biological and other chemical control practices.
- Monitor treated fungal populations for signs of fungicide insensitivity. If disease continues to progress after treatment with a product, DO NOT increase the use rate. Discontinue use of the product and switch to another fungicide with a different target site of action.
- Contact your local regional crops specialist or certified crop advisor for any additional pesticide management and/or IPM recommendations for specific crops and disease problems in your area.

Fungicide Modes of Action

Why are fungicides needed?

- Control of disease during crop establishment.
- Increase productivity of crop (photosynthesis) and/or reduce blemishes.
  - Maintain yield and/or market value.
- Improve storage life and quality of harvested plants / grain / produce.
  - Prevent spoilage and/or production of mycotoxins.

How do fungicides work?

There are several ways to define 'mode of action':

Timing:

- Preventative: fungicide must be present on plant surface before the pathogen and repeated applications are required to protect new growth.
- Curative: pathogen may already be present (post-infection, pre-symptom kick-back activity).
- Eradicant: (post-symptomatic activity).
- Inhibitive: prevents spore germination or sporulation.

Placement:

- Contact (AKA protectant): immobile – must come in direct contact with the pathogen.
- Systemic (AKA penetrant): mobile – can move within plant.

Movement:

- Intra-plant Movement: within crop via vapour phase or redistribution by rain.
- Passive Absorption – by diffusion.
- Apoplastic Movement: xylem-mobile; move within free space and cell walls, upward through the transpiration stream (with water).
- Symplastic Movement: phloem-mobile (common characteristic of herbicides and insecticides but very few fungicides).

Spectrum:

- General, Non-specific, or Broad Spectrum: fungicide affects pathogen in multiple ways.
- Specific or Narrow Spectrum: fungicide targets a specific metabolic site in pathogen or against critical enzyme or protein. Genetic changes or naturally insensitive fungi have a greater chance to overcome the fungicidal effect (resistance/insensitivity).

Composition:

- Inorganic Fungicides: sulfur or metal ions such as copper.
- Organic Fungicides: contain carbon atoms.
- Biopesticides: suppressing pest populations using naturally occurring organisms or natural products derived from plants.

Biochemistry:

- Primary basis to classify fungicides, developed by Fungicide Resistance Action Committee (FRAC) using their general Mode of Action on fungi and their chemistry.
  - All fungicides within a group share a common mode of action and resistance mechanism.
  - Fungicides within a group may have different chemical structures.
  - Resistance management strategies required wherever resistance is known or there is a risk of resistance development
  - See Table 1.

Table 1. Fungicide Groups Based on Biochemical Mode of Action (FRAC)

Mode of Action Target	Chemical Group & Chemical Name	Resistance Risk	Foliar Fungicide Products Registered in Saskatchewan/Manitoba	Seed Treatment Products Registered in Saskatchewan/Manitoba
A. Nucleic Acid Synthesis	4. Phenyl Amides	High	*Ridomil Gold/Bravo*, Ridomil Gold SL/Bravo*, Ridomil Gold 480EC, Ridomil Gold 480SL*	*Allegiance FL, Apron Advance*, Apron Maxx RFC*, Apron Maxx RTA*, Belmont 2.7FS, Cruiser Maxx Beans*, Cruiser Maxx Pulses*, Cruiser Maxx Vibrance Beans*, Cruiser Maxx Vibrance Cereals*, Cruiser Vibrance Quattro*, EverGol Energy*, Helix Vibrance*, Insure Cereal*, Maxim Quattro*, NipsIt Suite Cereals,*, Prosper Evergol*, Prosper FX*,Raxil MD*, Raxil PRO*, Raxil PRO Sheild*, Raxil WW, Trilex AL*, Trilex EverGol*, Vibrance Maxx RTA/RFC*, Vibrance Quattro*, Vibrance XL*, Vibrance XL Co-Pack**
B. Mitosis & Cell Division	1. Methyl Benzimidazole Carbamates	High	*Senator 70WP*	*Apron Advance*, Crown*, DCT*, Maxim Quattro*, Mertect SC, Senator PSPT*
	22. Benzamide	Low to Medium	*Gavel 75DF*, Torrent*	*Intego Solo*
C. Respiration	7. Carboxamides	Medium	*Cantus WDG Fungicide, Fontelis, Elatus*, Lance AG*, Lance WDG Fungicide, Luna Tranquility*, Priaxor*, Propulse*, Vertisan*	*Crown*, Cruiser Maxx Vibrance Beans*, Cruiser Maxx Vibrance Cereals*, Cruiser Vibrance Quattro*, Emesto Silver*, EverGol Energy*, Gaucho CS FL*, Helix Vibrance*, Prosper Evergol*, Prosper FX*, Rancona RS, Titan Emesto, *, Trilex EverGol*, Vibrance Maxx RTA/RFC*, Vibrance 500FS, Vibrance Quattro*, Vibrance XL*, Vibrance XL Co-Pack*, Vitaflo 280*, Vitaflo Fungicide*, Vitaflo SP Fungicide**
	11 Strobilurins	High	*Acapela, Cabrio Plus*, Delaro*, Elatus*, Exempla*, Headline EC, Lance AG*, Quadris, Quilt*, Priaxor*, Quadris Top*, Reason 500SC, Tanos 50DF*, TopNotch*, Twinline**	*Insure Cereal*, Maxim Quattro*, Prosper Evergol*, Prosper FX*, Stadium*, Trilex AL*, Trilex EverGol**
	21. Cyanoimidazole	Medium to High	*Ranman 400SC,*	None
	29. 2,6-Dinitroanilines	Low	*Allegro 500F*	None
	45. Triazolopyrimidyl-amine	Medium to High	*Zampro**	None
D. Amino Acid & Protein Synthesis	9. Anilinopyrimidine	Medium	*Astound*, Luna Tranquility*, Scala SC*	None
E. Signal Transduction	2. Dicarboximides	Medium to High	*Rovral Flo, Overall 240SC*	None

Continued...

Table 1. Fungicide Groups Based on Biochemical Mode of Action (FRAC) *continued*

Mode of Action Target	Chemical Group & Chemical Name	Resistance Risk	Foliar Fungicide Products Registered in Saskatchewan/Manitoba	Seed Treatment Products Registered in Saskatchewan/Manitoba
E. Signal Transduction *Continued*	12. Phenylpyrroles	Low to Medium	*Astound**	*Apron Advance*, Apron Maxx RFC*, Apron Maxx RTA*, Cruiser Maxx Beans*, Cruiser Maxx Potato Extreme*, Cruiser Maxx Pulses*, Cruiser Maxx Vibrance Beans*, Helix Vibrance*, Maxim D*, Maxim MZ PSP*, Maxim PSP, Maxim Quattro*, Proseed, Stadium*, Vibrance Maxx RTA/RFC*, Vibrance Quattro**
F. Lipid / Membrane Synthesis & Cell Wall Degradation	28. Carbamates	Low to Medium	*Tattoo C**	None
	40. Carboxylic Acid Amides (CAA)	Low to Medium	*Acrobat 50WP, Revus, Revus Top*, Zampro**	None
	44. *Bacillus* strain QST 713	Low	*Serenade CPB, Serenade Max*	None
G. Sterol Biosynthesis	3. Demethylation Inhibitors	Medium	*Bumper 418EC, Caramba, Delaro*, Exempla*, Fullback 125SC, Folicur 432F, Folicur 250EW, Fuse, Inspire, Palliser, Pivot 418EC, Proline 480SC, Propel, Propiconazole Fungicide, Propulse*, Prosaro 250EC, Quadris Top*, Quash, Quilt*, Revus Top*, Tilt 250E, TopNotch*, Twinline**	*Armour, Armour RTU, Charter RTU, Cruiser Maxx Potato Extreme*, Cruiser Maxx Vibrance Cereals*, Cruiser Vibrance Quattro*, Emesto Silver*, EverGol Energy*, Gemini*, Helix Vibrance*, Insure Cereal*, Maxim D*, NipsIt Suite Cereals, , Rancona Apex, Rancona RS, Raxil MD*, Raxil PRO*, Raxil PRO Shield*, Raxil WW*, Stadium*, Vibrance Quattro*, Vibrance XL*, Vibrance XL Co-Pack*, Titan Emesto**
U. Unknown	27. Cyanoacetamide-oximes	Low to Medium	*Curzate 60DF, Tanos 50DF**	None
	33 Phosphonates	Low	*Confine Extra, Phostrol*	*Confine, Confine Extra, Rampart*
	NC (Not classified) and diverse	Not known	*Contans WG, Regalia Maxx*	*Heads Up Plant Protectant, StorOx*
M. Multi-Site Contact Activity	M1. Inorganic copper	Low	*Copper* products, *Cueva*	None
	M2. Inorganic sulphur		*Kumulus DF*	None
	M3. Dithiocarbamates		*Cabrio Plus*, Dithane Rainshield, Gavel 75DF*, Kingpin 75 WDG, Manzate Pro-Stick, Penncozeb 75DF, Polyram DF*	*Gaucho CS FL*, Potato ST16, Solan MZ, Thiram 75 WP, Tuberseal, Vitaflo 280*, Vitaflo Fungicide*, Vitaflo SP Fungicide*, Gemini*, Maxim MZ PSP**
	M4. Phthalimides		None	*Agrox FL, Gemini*, Maxim MZ PSP**
	M5. Chloronitriles		*Bravo 500, Bravo Zn, Echo 720, Echo 90DF, Ridomil Gold/Bravo*, Ridomil Gold SL/Bravo*, Tattoo C**	None

*Products contain more than one active ingredient and appear in more than one group.

Foliar Fungicide Tables

Table 2. Foliar Fungicides for Disease Control in Potatoes

FUNGICIDES	Page	Black Dot	Botrytis Gray Mould / Botrytis Vine Rot	Brown Leaf Spot	Early Blight	Late Blight	Late Blight Tuber Rot / Tuber Blight	Pythium Leak	Pink Rot	Rhizoctonia Canker, Black Scurf, Stolon Canker, and Stem Rot	Silver Scurf	Sclerotinia stem rot
Acrobat WP						1	1					
Allegro 500F						•						•
Bravo 500			•		•	•						
Bravo Zn					•	•						
Cabrio Plus					•	•						
Cantus WDG					•							
Copper (Copper 53W, Copper Spray)					•	•						
Curzate 60 DF						1						
Dithane Rainshield					•	•						
Echo 90DF / Echo 720			•		•	•						
Gavel 75 DF					•	•						
Headline EC					•	•						
Inspire					•							
Kingpin 75 WDG					•	•						
Luna Tranquility		4		•	•							•
Manzate Pro-Stick					•	•						
Parasol WG					•	•	•					
Penncozeb 75 DF					•	•						
Phosphorous acid (Confine Extra, Rampart)						•			•			
Phostrol						•	•		2,3			
Polyram DF					•	•						
Quadris		•			•	•				2	2	
Quadris Top		4		4	•							4
Quash					•							4
Ranman 400SC						•	•					
Reason 500SC					1	1						
Revus						•						
Revus Top					•	•						
Ridomil Gold/Bravo, Ridomil Gold SL/Bravo			•		•	•	•	3	3			
Ridomil Gold 480EC, Ridomil Gold 480SL									2			
Scala SC					1							
Serenade Max					3							3
Tanos 50 DF					•	•						
Tattoo C						•						
Vertisan			•		3					2		
Zampro						•	•					

Note: Before using any pesticide on potatoes, consult the list of Agricultural Pesticides Approved for Use, available from Simplot Canada and McCain Foods (Canada).

- • Fungicide registered against the disease

1. Must not be used alone, only as a tank mix (consult individual labels)
2. In-furrow treatments (suppression only)
3. Suppression only (foliar application)
4. Suppression only

Table 3. Foliar Fungicides for Disease Control in Cereals and Grasses

FUNGICIDES	Page	WHEAT								BARLEY									OAT					RYE				TRITICALE					MILLET		CORN			CANARYSEED	SEED GRASSES		TIMOTHY
		Suppression of Fusarium Head Blight	Powdery Mildew (*Blumeria graminis*)	Leaf Rust (*Puccinia recondita* f. sp. *tritici*)	Stem Rust (*Puccinia graminis* f. sp. *tritici*)	Stripe Rust (*Puccinia striiformis*)	Septoria Leaf Blotch Complex (1)	Spot Blotch	Tan Spot (*Pyrenophora tritici-repentis*)	Suppression of Fusarium Head Blight	Net Blotch (*Pyrenophora teres*)	Powdery Mildew (*Blumeria graminis*)	Leaf Rust (*Puccinia hordei*)	Stem Rust (*Puccinia graminis* f. sp. *tritici / secalis*)	Stripe Rust (*Puccinia striiformis*)	Scald (*Rynchosporium secalis*)	Septoria Leaf Blotch Complex	Spot Blotch (*Cochliobolus sativus*)	Suppression of Fusarium Head Blight	Powdery Mildew (*Blumeria graminis*)	Crown Rust (*Puccinia coronata*)	Stem Rust (*Puccinia graminis* f. sp. *avenae*)	Septoria Leaf Blotch Complex	Suppression of Fusarium Head Blight	Powdery Mildew (*Blumeria graminis*)	Leaf Rust (*Puccinia recondita* f. sp. *tritici*)	Septoria Leaf Blotch Complex	Suppression of Fusarium Head Blight	Powdery Mildew (*Blumeria graminis*)	Leaf Rust (*Puccinia recondita* f. sp. *tritici*)	Stem Rust (*Puccinia graminis* f. sp.*secalis*)	Septoria Leaf Blotch Complex	Suppression of Fusarium Head Blight	Rust (*Puccinia substriata* var. *indica*)	Ear Rot (*Fusarium*/*Giberella* spp.)	Northern Leaf Blight (*Setosphaeria turcica*)	Common rust (*Puccinia sorghi*)	Suppression of Septoria Leaf Mottle (*Septoria triseti*)	Leaf & Stem Rusts (*Puccinia* spp.)	Powdery Mildew (*Blumeria graminis*)	Purple Eye Spot (*Cladosporium phlei*)
Acapela			●	●		●	●		●		●	●			●		●			●						●	●		●	●		●				●					
Bravo 500		●					1*		●																																
Bumper 418EC			●	●	●	●	1*		●		●	●	●	●		●	●	●			●		●													●	●	●			
Caramba		●	●	●	●	●	●	●	●	●	●	●	●		●	●		●	●		●		●	●	●	●			●	●	●	●			●						
Dithane Rainshield				●			●		●																																
Echo 720		●					1*		●																																
Folicur 432F/Folicur 250EW		●	●	●	●	●	1*		●		●	●	●	●	●	●	●	●			●	●																			
Fuse		●	●	●	●	●	1*		●		●	●	●	●	●	●	●	●			●	●																			
Headline EC			●	●		●	●	●	●		●				●	●		●			●					●											●		●	●	
Kingpin 75 WDG				●			●		●																																
Manzate Pro-Stick				●			●		●																																
Palliser		●	●	●	●	●	1*		●		●	●	●	●	●	●	●	●			●	●																			
Pennozeb 75DF				●			●		●																																
Pivot 418EC			●	●	●	●	1*		●		●	●	●	●		●	●	●			●		●													●	●	●			●
Priaxor			●	●		●	●	●	●		●	●			●	●		●			●					●			●	●		●				●	●		●	●	
Proline 480SC		●		●			1*		●	●	●					●		●			●		●										●	●	●	●	●				
Propel			●	●	●	●	1*		●		●	●	●	●		●	●	●			●		●					●								●	●	●			●
Nufarm Propiconazole Fungicide			●	●	●	●	1*		●		●	●	●	●		●	●	●			●		●													●	●	●			●
Prosaro 250EC		●	●	●	●	●	1*		●	●	●	●	●	●	●	●	●	●			●	●	●																		
Quadris																																					●				
Quilt				●		●	●		●		●		●		●	●	●				●		●				●					●				●	●				
Regalia Maxx							●																																		
Tilt 250E			●	●	●	●	1*		●		●	●	●	●		●	●	●			●		●													●	●	●			●
TopNotch				●		●	●		●		●		●		●	●	●										●														
Twinline		●	●	●		●	●	●	●	●	●				●	●		●			●		●			●		●	●	●		●									
Vertisan				●	●		●							●			●					●				●				●	●	●					●				

Refer to product pages and labels for application information as well as expectations for control vs suppression.

1. Septoria/Stagonospora leaf blotch complex: *some products include glume blotch in wheat.

Table 4. Foliar Fungicides for Disease Control in Pulse, Alfalfa and Coriander Crops

FUNGICIDES	Page	CHICKPEA				PEA					LENTIL					FABABEAN				BEAN					ALFALFA FOR SEED					Blossom Blight in **CORIANDER**	Blossom Blight in **CARAWAY**
		Ascochyta Blight (*Ascochyta rabiei*)	Grey Mould (*Botrytis cinerea*)	Powdery Mildew (*Erysiphe* spp.)	White Mould (*Sclerotinia sclerotiorum*)	Ascochyta Complex (1)	Downy Mildew (*Peronospora viciae*)	Grey Mould (*Botrytis cinerea*)	Powdery Mildew (*Erysiphe pisi*)	White Mould (*Sclerotinia sclerotiorum*)	Anthracnose (*Colletotrichum truncatum*)	Ascochyta Blight (*Ascochyta lentis*)	Grey Mould (*Botrytis cinerea*)	Powdery Mildew (*Microsphaera* spp.)	White Mould (*Sclerotinia sclerotiorum*)	Ascochyta Blight (*Ascochyta fabae*)	Botrytis Grey Mould (*Botrytis* spp.) / Chocolate Spot	Powdery Mildew (*Microsphaera* spp.)	White Mould (*Sclerotinia sclerotiorum*)	Anthracnose (*Colletotrichum lindemuthianum*)	Botrytis Grey Mould (*Botrytis cinerea*)	Powdery Mildew (*Microsphaera* spp.)	Rust (*Uromyces appendiculatus*)	White Mould (*Sclerotinia sclerotiorum*)	Blossom Blight (*Botrytis cinera / Sclerotinia sclerotiorum*)	Common Leaf Spot (*Pseudopeziza medicaginis*)	Leaf Spot (*Leptosphaerulina trifolii/briosiani*)	Spring Black Stem (*Phoma medicaginis*)	Stem Rot (*Sclerotinia trifoliorum/sclerotiorum*)		
Acapela					●	●				●	●				●				●					●							
Allegro 500F																								●							
Bravo 500		●				●					●	●																			
Bumper 418EC																							●								
Contans																								●							
Copper 53W																				●											
Delaro		●	●		●	●		●		●	●	●	●		●																
Dithane Rainshield											●	●														●					
Echo 720		●				●					●	●																			
Elatus		●				●			●		●	●				●				●											
Fontelis																													●		
Headline EC		●				●	●		●		●	●				●		●		●		●	●			●					
Kingpin 75 WDG											●	●														●					
Lance		●	●		●	●	●	●				●	●		●				●					●	●	●	●	●	●		
Lance AG (co-pack of *Lance WDG* and *Headline EC*)		●	●	●		●	●	●	●			●	●	●							●										
Manzate Pro-Stick											●	●														●					
Parasol WG																				●											
Penncozeb 75DF											●	●														●					
Pivot 418EC																							●								
Priaxor		●	●		●	●	●		●	●	●	●	●		●	●	●	●	●	●		●	●								
Proline 480SC		●										●																			
Propel		●		●					●			●		●				●				●	●			●					
Nufarm Propiconazole Fungicide																							●								
Propulse																●			●	●				●							
Quadris		●				●			●		●	●				●				●										●	
Quash		●			●				●	●		●			●									●							
Quilt				●		●			●		●			●				●				●									
Senator 70WP																								●							
Serenade CPB			●		●			●		●			●		●						●			●							
Serenade Max			●		●			●		●			●		●						●			●						●	●
Tilt 250E				●					●					●				●				●	●								
Vertisan		●	●			●		●				●	●			●					●										

Refer to product pages and labels for application information as well as expectations for control vs suppression.

1. Ascochyta Complex in Peas may include *Mycosphaerella pinodes*, *Ascochyta pisi*, and *Phoma medicaginis* var. *pinodella*. Refer to product page and label for more information.

Table 5. Foliar Fungicides for Disease Control in Oilseed Crops

FUNGICIDES	Page	CANOLA			MUSTARD			FLAX		SUNFLOWER		SOYBEAN					
		Alternaria Black Spot (*Alternaria* spp.)	Blackleg (*Leptosphaeria maculans*)	Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)	Alternaria Black Spot (*Alternaria* spp.)	Blackleg (*Leptosphaeria maculans*)	Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)	Pasmo (*Septoria linicola*)	Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)	Rust (*Puccinia helianthi*)	Sclerotinia Stem/Head Rot (*Sclerotinia sclerotiorum*)	Phomopsis stem blight (*Phomopsis/Diaporthe* spp.)	Anthracnose (*Colletotrichum truncatum*)	Brown Spot (*Septoria glycines*)	Cercospora Leaf Spot (*Cercospora kikuchii*)	Powdery Mildew (*Microsphaera diffusa*)	Sclerotinia Stem Rot (*Sclerotinia sclerotiorum*)
Acapela				•										•			•
Allegro 500F																	•
Astound				•													
Bumper 418EC			•														
Contans				•							•						•
Delaro												•		•			•
Elatus														•	•	•	
Exempla		•	•	•	•	•	•		•		•						•
Folicur 250EW																•	
Fullback 125SC														•	•		
Headline EC		•	•		•	•		•		•							
Lance		•		•	•		•				•						
Lance AG (co-pack of *Lance WDG* and *Headline EC*)		•		•	•		•			•	•						•
Overall 240SC		•		•													
Pivot 418EC			•														
Priaxor		•	•	•	•	•	•	•	•	•				•			•
Proline 480SC									•		•						
Propel			•												•	•	
Nufarm Propiconazole Fungicide			•														
Quadris		•	•	•											•	•	
Quash				•						•	•						
Quilt			•										•			•	
Rovral Flo		•		•													
Serenade CPB				•										•			•
Serenade Max				•			•		•					•			•
Tilt 250E			•												•	•	
Vertisan				•						•	•			•			

Refer to product pages and labels for application information as well as expectations for control vs suppression.

Foliar Fungicide Product Pages

Acapela

Fungicide Group – 11
(Refer to page 346)

Company:

E.I. duPont Canada Company – PCP# 30470

Formulation:

250 g per L picoxystrobin formulated as a suspension concentrate.

Container size 2 x 9.6 L, 115.2 L tote

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre):	Appiication Timing:
Chickpea, dry bean, faba bean	Suppression of white mould (*Sclerotinia sclerotiorum*)	350 mL	Make initial application at early bloom and follow with second application 7 to 10 days later at full bloom.
Field pea	Control of mycosphaerella blight (*Mycosphaerella pinodes*)	240 to 350 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.
	Suppression of sclerotinia rot/ white mould (*Sclerotinia sclerotiorum*)	350 mL	Make initial application at early bloom and follow with second application 7 to 10 days later at full bloom
Lentil	Control of anthracnose (*Colletotrichum truncatum*), ascochyta blight (*Ascochyta lentis*)	240 to 350 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.
	Suppression of sclerotinia rot/ white mould (*Sclerotinia sclerotiorum*)	350 mL	Make initial application at early bloom and follow with second application 7 to 10 days later at full bloom
Wheat	Control of leaf rust (*Puccinia recondita*), stripe rust (*P. striiformis*), septoria leaf blotch (*Septoria tritici*), powdery mildew (*Erysiphe graminis*), tan spot (*Pyrenophora tritici-repentis*)	175 to 350 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high. Apply at Feekes 9, "flag leaf out". Do not apply after flowering (Feekes 10.5)
Barley	Control of septoria leaf blotch (*Septoria tritici*), powdery mildew (*Erysiphe graminis*), stripe rust (*Puccinia striiformis*), net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*)	175 to 350 mL	
Oats	Control of powdery mildew (*Erysiphe graminis*), stripe rust (*Puccinia striiformis*), crown rust (*Puccinia coronata* f.sp. *avenae*)	175 to 350 mL	
Rye	Control of leaf rust (*Puccinia recondita*), stripe rust (*P. striiformis*), septoria leaf blotch (*Septoria tritici*), powdery mildew (*Erysiphe graminis*), scald (*Rhynochosporium secalis*)	175 to 350 mL	

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Triticale	Control of leaf rust (*Puccinia recondita*), stripe rust (*P. striiformis*), septoria leaf blotch (*Septoria tritici*), powdery mildew (*Erysiphe graminis*)	175 to 350 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high. Apply at Feekes 9, "flag leaf out". Do not apply after flowering (Feekes 10.5)
Corn (field corn, sweet corn, seed popcorn)	Control of northern leaf blight (*Setosphaeria turcica, Exserohilum turcicum*)	215 to 325 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.
Soybean	Control of brown spot (*Septoria glycines*)	175 to 350 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.
	Suppression of white mould (*Sclerotinia sclerotiorum*)	350 mL	Initial preventative application at 100% bloom (1 flower blooming on all plants) and follow with 2nd application 7 to 10 days later at full bloom.
Canola	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	325 to 485 mL	Apply at 20 to 50% bloom prior to disease development. Under high disease pressure, make a second application of another fungicide from a different fungicide group, 7 to 14 days later. Use the higher rate or shorter interval when disease pressure is high.

Application Information:

Water Volume: Use sufficient water to obtain thorough coverage of plants.

Ground: minimum 45 L per acre.
Aerial: minimum 20 L per acre.

How it Works:

The active ingredient picoxystrobin is a broad spectrum strobilurin fungicide and is to be used as a preventative application when environmental conditions are favorable for disease development. Picoxystrobin has curative and locally systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Dry legumes – DO NOT exceed 1 application before switching to a fungicide with a different mode of action; maximum season use rate 700 ml per acre. Cereal grains, soybeans – DO NOT exceed 2 applications before switching to a fungicide with a different mode of action; maximum season use rate 1100 ml per acre. Corn – DO NOT exceed 2 applications before switching to a fungicide with a different mode of action; maximum season use rate for field, seed or popcorn is 1100 ml per acre and sweet corn is 1400 ml per acre.

Grazing: No restrictions listed.

Preharvest interval: Dry legumes and soybeans – 14 days, Cereal grains – 45 days (7 days for forage, 14 days for hay), Corn – 7 days, Canola - 28 days

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: Crops that are on the product label may be replanted immediately after harvest. All other crops -10 months following last application of picoxystrobin.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closer. To prevent contamination, store this product away from food or feed.

Environment: Observe prescribed buffer zones. Minimize off-target drift to reduce the effects on beneficial insects at the field boundary. DO NOT apply to areas prone to run-off and delay spraying if heavy rainfall is forecast.

Hazard Rating:

None listed.

For an explanation of the symbols used here see page 11.

Acrobat 50 WP

Fungicide Group – 40
(Refer to page 346)

Company:

BASF Canada – PCP#27700

Formulation:

50% dimethomorph formulated as a wettable powder. Container size - 8 x 1.82 kg.

Crops, Diseases and Timing:

Control of late blight (*Phytophthora infestans*) and reduction of late blight tuber rot on potato.

Make the first application when the disease threatens or when the first visible signs of disease occur in the field or nearby. Apply every 5 to 7 days under high disease pressure or every 7 to 10 days under low disease pressure. A minimum of 5 days between applications is required. It is recommended to apply this product alternately with a fungicide having a different mode of action. Apply after top kill to control tuber rot under high levels of late blight infection.

Rate:

Apply at 180 g per acre. **DO NOT apply *Acrobat 50 WP* alone.** This fungicide must be tank mixed with one of the following fungicides: *Dithane Rainshield*, or *Bravo 500*, at the recommended product label rate.

Application Information:

Water Volume: Use sufficient water to obtain adequate spray coverage.
Ground: 20 to 40 L per acre for concentrate sprays to 91 to 648 L per acre for dilute sprays.
Aerial: optimum 20 L per acre.

How it Works:

The active ingredient dimethomorph is a Carboxylic Acid Amide (CAA) fungicide with contact, systemic and antisporulant activity. To be used as a preventative and inhibitive (antisporulant) fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides: Must be tank mixed with one of the following fungicides: *Dithane Rainshield, Bravo 500.*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 3 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 4 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: DO NOT replant in treated area within 120 days of last application.

Storage: Store under cool, dry conditions in secure, well ventilated buildings away from food or feed.

Environment: DO NOT apply to terrain where there is a potential for surface runoff to enter aquatic systems. This product is highly toxic to aquatic organisms. DO NOT apply within 100 m of streams, ponds, rivers and lakes when applying by air and within 50 m when applying by ground. When using *Acrobat 50 WP* consult the labels of the tank mix partner and observe the largest buffer zone of the product used in the tank mix.

Hazard Rating:

▽ Caution – Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Allegro 500F

Fungicide Group – 29
(Refer to page 346)

Company:

Syngenta Canada – PCP#27517

Formulation:

40% fluazinam. Container size – 2 x 10 L.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Potato	Late blight *(Phytophthora infestans)*	160 mL	Begin applications when plants are 15 to 20 cm tall or when conditions favour disease development. Repeat application at 7 to 10 day intervals.
	Sclerotinia stem rot *(Sclerotinia sclerotiorum)*	160 to 240 mL	Begin applications at full bloom. Repeat application intervals of 7 to 10 days.
Dry beans	White mould *(Sclerotinia sclerotiorum)*	240 to 405 mL	Begin applications when plants are at early to mid bloom (10 to 50% bloom). Repeat application 7 to 10 days later.
Soybeans	White mould *(Sclerotinia sclerotiorum)*	180 to 470 mL	For suppression of white mould use 180 mL rate. For control of white mould use 355 to 470 mL rate. Begin application at the R1 (early bloom) to R2 (full bloom) stage of development and if needed, again 10 to 14 days later at early pod formation (R3).

Application Information:

Water Volume: 80 to 240 L per acre. Spray volumes vary with amount of plant growth; apply in sufficient water to obtain adequate coverage of foliage. DO NOT apply by air.

How it Works:

The active ingredient fluazinam is a pyridinamine fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Note: Syngenta supports the following mixes that are not on the *Allegro 500F* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Reglone* (potatoes)

Fungicides: *Quadris*

Insecticides: *Matador* (dry beans)

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Bean and soybean – DO NOT exceed 2 applications of this product per season. Potato – DO NOT exceed 3 consecutive applications or 10 total applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 14 days (potatoes); 30 days (dry beans). DO NOT apply after growth stage R3, early pod formation in soybeans.

Re-entry: DO NOT re-enter treated areas within 24 hours of application.

Re-cropping: Can be replanted with potatoes as soon as practical after the last application, 30 days for other root crops and leafy vegetables, and 70 days for all other crops. Fluazinam will carry over, DO NOT use in areas treated with this product during the previous season.

Storage: Store product in a dry place separate from other pesticides, fertilizer, food, and feed.

Environment: DO NOT contaminate aquatic habitats when cleaning and rinsing spray equipment or containers. DO NOT overspray non-target terrestrial or aquatic habitats.

Hazard Rating:

▽ Caution – Poison.

◇ Warning – skin irritant. Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Astound

Fungicide Group – 9, 12

(Refer to page 346)

Company:

Syngenta Canada – PCP #29648

Formulation:

37.5% cyprodinil and 25.0% fludioxonil formulated as wettable granules. Container size - 2 x 6.28 kg.

Crops, Diseases and Timing:

Control of sclerotinia stem rot caused by *Sclerotinia sclerotiorum* in canola. One application at 20 to 50% flowering, optimum at 20 to 30%.

Rates:

Apply at 310 to 395 g per acre. Apply higher rate under conditions of high disease pressure.

Application Information:

Water volume: Use sufficient water to obtain thorough coverage.

Ground: minimum 80 L per acre.

Aerial: minimum 18 L per acre.

How it Works:

The active ingredient cyprodinil is a anilinopyrimidine fungicide and the active ingredient fludioxonil is a phenylpyrrole fungicide. Together they provide contact and systemic activity and inhibit spore germination and penetration. To be used as a preventative and curative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Astound fungicide can be tank mixed with *Matador 120EC* insecticide at a rate of 314 to 395 g per acre *Astound* and 34 mL per acre *Matador 120EC* for control of insects and diseases on canola. Refer to labels for diseases and insects controlled, specific application instructions, and precautions. Pests and crops must be at the correct stage as specified on both labels. DO NOT apply more than 1 application of this tank mix per season.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: No restrictions listed.

Grazing: No restrictions listed.

Preharvest interval: DO NOT apply within 35 days of harvest.

Re-entry: DO NOT re-enter treated area within 12 hours of application.

Re-cropping: DO NOT plant any other crop for a period of 30 days after harvest or crop failure unless *Astound* is registered for that use.

Storage: Store in a dry place.

Environment: This product is toxic to aquatic organisms; DO NOT apply directly to aquatic habitats. For ground application, buffer zones must be 1 m for protection of aquatic habitats. For aerial application (fixed and rotary wing), buffer zones must be 10 m for aquatic habitats less than 1 m deep and 2 m for aquatic habitats deeper than 1 m. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. DO NOT apply this product through any type of irrigation system.

Hazard Rating:

▽ Caution – Eye irritant.

Keep out of reach of children.

For an explanation of the symbols used here see page 11.

Cabrio Plus

Fungicide Group – 11, M3
(Refer to page 346)

Company:

BASF Canada – PCP#30395

Formulation:

5% pyraclostrobin and 55% metiram formulated as a water dispersible granule.

Container size – 20 kg.

Crops, Diseases and Timing:

Control of early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) in potato. Application should begin prior to row closure or when conditions become favourable for the development of disease. For early blight apply on a 7 to 14 day interval and for late blight apply on a 7 to 10 day interval.

Rates:

Apply at 0.91 to 1.35 kg per acre.

Application Information:

Water Volume:

Ground: Minimum of 80 L per acre.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient metiram is a dithiocarbamate fungicide with contact activity. The active ingredient pyraclostrobin is a member of the strobilurin class of chemistry used as a broad spectrum fungicide. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 3 applications of this product per season.

Grazing: Crop can be grazed or fed to livestock.

Preharvest Interval: 3 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: A plant back interval of 14 days is required for all crops not listed on the label

Storage: Store in original tightly closed container.

Environmental Hazards: Avoid run-off from treated areas into aquatic areas. Toxic to aquatic organisms, non-target terrestrial plants and small wild animals.

Hazard Rating:

☠ Warning – Poison

⚠ Warning – Eye and Skin Irritant.

For an explanation of the symbols used here see page 11.

Cantus WDG Fungicide

Fungicide Group – 7
(Refer to page 346)

Company:

BASF Canada – PCP#30141

Formulation:

70% boscalid formulated as a water dispersible granulules.

Container size – 4 x 2.83 kg.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Potato	Early blight (*Alternaria solani*)	70 to 130 g	Apply prior to disease development and at 14 day intervals if conditions continue to favour disease development.

Application Information:

Water Volume:

Ground: Use a minimum water volume of 40 L per acre and ensure thorough coverage of foliage.

Aerial: Use a minimum water volume of 16 L per acre and ensure thorough coverage of foliage.

Pivot and Sprinkler Irrigation: DO NOT exceed 0.64 cm (1/4 inch) or 25,700 L per acre. Apply only through sprinkler systems including centre pivot, lateral move, end two, side (wheel) roll, traveler, big gun, solid set, or hand move irrigation systems. The system must contain functional valves to prevent water source contamination from backflow.

How it Works:

The active ingredient boscalid is a carboxamide (SDHI) fungicide with systemic activity. It inhibits spore germination, mycelia growth and sporulation of the fungus on the leaf surface. To be used as a preventative application when environmental conditions are favourable for disease development. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: 4 applications per season on potatoes.

Grazing: No restriction listed.

Preharvest interval: Potato - 30 days

Re-entry: DO NOT re-enter treated area for 12 hours after application or until dry.

Re-cropping: A plant back restriction of 14 days is required for all crops not on the label.

Storage: Store in a cool, dry, locked, well-ventilated area without a floor drain.

Environment: Toxic to aquatic organisms and non-target terrestrial plants. DO NOT apply to areas where runoff is likely to occur, or near. any body of water. Avoid drifting of spray onto any body of water or other non-target areas. Specified buffer zones should be observed.

Hazard Rating:

▽ Caution Poison – Potential Skin Sensitizer.

◇ Warning – Eye irritant.

For an explanation of the symbols used here see page 11.

Caramba

Fungicide Group – 3
(Refer to page 346)

Company:

BASF Canada – PCP#29767

Formulation:

90 g per L metconazole formulated as an emsulfiable concentrate.

Container size – Case (2 x 8.1L); 128 L drum; or 400 L tote.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre)*:	Application Timing:
Wheat	Control of leaf rust (*Puccinia triticina*), stripe rust (*Puccinia striiformis*), stem rust (*Puccinia graminis*), powdery mildew (*Erysiphe graminis* f. sp. *tritici*), tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria tritici*); suppression of spot blotch (*Cochliobolus sativus*)	200 to 280 mL	Apply prior to disease development or at the onset of disease.
	Suppression of fusarium head blight (*Fusarium* spp.)	400 mL	Apply prior to development of the disease when environmental conditions are favourable for disease development. Apply within the time period when at least 75% of the heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower.
Barley	Control of net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*), leaf rust (*Puccinia hordei*); stripe rust (*Puccinia striiformis*), powdery mildew (*Erysiphe graminis*); suppression of spot blotch (*Cochliobolus sativus*)	200 to 280 mL	Apply prior to disease development or at the onset of disease.
	Suppression of fusarium head blight (FHB) (*Fusarium* spp.)	400 mL	Apply prior to development of the disease when environmental conditions are favourable for disease development. Apply between full head emergence and up to 3 days after full emergence of main stem heads.
Oats	Control of crown rust (*Puccinia coronata*), septoria leaf blotch (*Septoria avenae*)	200 to 280 mL	Apply prior to disease development or at the onset of disease.
	Suppression of fusarium head blight (*Fusarium* spp.)	400 mL	Apply prior to development of the disease when environmental conditions are favourable for disease development. Apply within the time period when at least 75% of the heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower.
Corn*	Suppression of fusarium (*Fusarium graminearum*) and gibberella (*Gibberella zeae*) ear rots	400 mL	Apply when the crop is between silking and silk browning stage for maximum suppression. Ensure silk coverage for optimum efficacy.

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases Controlled:	Application Rate (per acre)*:	Application Timing:
Rye	Control of leaf rust (*Puccinia recondita*), stripe rust (*Puccinia striiformis*), powdery mildew (*Erysiphe graminis*)	200 to 280 mL	Apply prior to disease development or at the onset of disease.
	Suppression of fusarium head blight (*Fusarium* spp.)	400 mL	Apply prior to development of the disease when environmental conditions are favourable for disease development. Apply within the time period when at least 75% of the heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower.
Triticale	Control of leaf rust (*Puccinia triticina*), stripe rust (*Puccinia striiformis*), stem rust (*Puccinia graminis*), powdery mildew (*Erysiphe graminis* f. sp. *tritici*), tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria tritici*); suppression of spot blotch (*Cochliobolus sativus*)	200 to 280 mL	Apply prior to disease development or at the onset of disease.

* A case can treat 40 acres after heading (suppression of FHB) or 60 to 80 acres before heading (leaf disease). A drum can treat 320 acres after heading (suppression of FHB) or 460 to 640 acres before heading (leaf disease). Corn includes field corn, sweet corn, pop corn and seed production corn)

Application Information:

Water Volume:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 20 L per acre.

Consult nozzle manufacturers for specific nozzle and pressure recommendations.

How it Works:

The active ingredient metconazole is a broad spectrum triazole demethylation inhibitor (DMI) fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None listed.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Wheat, oats, rye, barley, corn – DO NOT exceed 1 application of this product per season.

Grazing: All crops can be grazed or fed to livestock.

Preharvest interval: Wheat, barley, oats, rye 30 days, field corn grain 20 days, sweet corn see label harvesting restrictions.

Re-entry: Wheat, barley, oats, rye – DO NOT re-enter treated areas within 12 hours of application. Corn - DO NOT re-enter treated area for 12 hours or up to 3 days depending on re-entry activity (see label instructions).

Re-cropping: A plant back interval of 35 days is required for all crops not listed on the label.

Storage: Store in original tightly closed container. Protect from freezing.

Environment: Avoid run-off from treated areas into aquatic areas. Toxic to aquatic organisms, non-target terrestrial plants and small wild animals.

Hazard Rating:

⚠ Warning – Eye irritant.

Check label for first-aid information.

For an explanation of the symbols used here see page 11.

Chlorothalonil

Fungicide Group – M5
(Refer to page 346)

Bravo 500/Bravo Zn/Echo 720/Echo 90DF

Company:

Syngenta Canada (*Bravo 500* – PCP#15723, *Bravo Zn* – PCP#28900)

UAP (*Echo 720* – PCP#29355, *Echo 90DF* – PCP#29356)

Formulation:

Bravo 500 - 500 g per L chlorothalonil formulated as a suspension. Container sizes - 2 x 10 L case and 450 L.

Bravo Zn - 500 g per L chlorothalonil formulated as a suspension. Container sizes - 10 L and 450 L.

Echo 720 - 720 g per L chlorothalonil formulated as a suspension. Container size - 2 x 9.46 L case, 450 L and 984.1 L.

Echo 90DF - 90% chlorothalonil formulated as a dry flowable. Container size - 10 kg.

Crops, Diseases, Rates and Timing:

Crop:	**Diseases:**	**Application Rate (per acre):**		**Application Timing:**
		Bravo 500	***Echo 720***	
Wheat	Control of tan spot *(Pyrenophora tritici-repentis)*, septoria glume blotch, septoria leaf blotch (*Septoria tritici*)	600 to 1000 mL	405 to 690 mL	Begin application at flag leaf emergence; repeat 10 to 14 days later when heads are visible. A third application when heads are fully emerged may be necessary.
	Suppression of fusarium head blight (*Fusarium* spp.)	800 to 1000 mL	570 to 690 mL	For suppression of Fusarium head blight apply at early flowering (before flowering has started in the majority of tillers) and before the beginning of weather favouring disease.
Pea	Control of mycosphaerella blight *(Mycosphaerella pinodes)*	800 to 1200 mL	570 to 850 mL	Begin application at early flowering and repeat 10 days later at early pod set or mid-flowering if necessary. Make a third application 10 to 14 days after the second application at pod fill or later flowering should conditions remain favourable for disease.
Lentil	Control of ascochyta blight *(Ascochyta lentis)*, anthracnose *(Colletotrichum truncatum)*	800 to 1600 mL	570 to 1130 mL	For one application only, apply at early flowering. For two applications: apply first before flowering when bud formation is evident; apply second at early to mid-flowering 10 to 14 days after the first application but before rows close in.
Chickpea	Control of ascochyta blight *(Ascochyta rabiei)*	1200 to 1600 mL for first application; 800 to 1200 mL for subsequent applications.	850 to 1130 mL for first application; 570 to 850 mL for subsequent applications.	Make first application at very early flowering and remaining applications at 10 day intervals.

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop	Diseases Controlled:	Application Rate* (per acre):				Application Timing:
		Bravo 500	***Bravo Zn***	***Echo 720***	***Echo 90DF***	
Potato	Late blight (*Phytophthora infestans)*	480 to 1000 mL	480 to 1000 mL	320 to 690 mL	280 to 530 grams	Begin application when plants are 6 to 8 inches (15 to 20 cm) high or when disease threatens. Repeat applications at 7 to 10 day intervals or as necessary to maintain disease control. * Under high disease pressure, use higher rate and shorter spray intervals.
	Early blight (*Alternaria solani*)	640 to 1000 mL	640 to 1000 mL	445 mL	370 to 530 grams	
	Botrytis vine rot (*Botrytis cinerea*)	640 to 1000 mL	-	480 to 1000 mL	370 to 530 grams	

Application Information:

Water Volume: Volume will vary with crop and amount of plant growth. Use sufficient water to obtain adequate coverage of foliage.

Ground: Spray volume will usually range from 90 to 640 L per acre for dilute sprays and 20 to 40 L per acre for concentrate sprays.

Chickpea - 90 L per acre. Ground application only.

Aerial: Use minimum of 12 L per acre.

How it Works:

The active ingredient chlorothalonil is a chloronitrile fungicide with multi-site contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

DO NOT combine with pesticides, surfactants or fertilizers unless prior use has shown the combination is physically compatible and non-injurious under your conditions of use.

Fungicides: For control of early blight in potato, *Bravo 500* may be tank-mixed with 200 mL per acre *Quadris*. DO NOT apply sequential applications of this tank-mix and DO NOT exceed 3 tank-mix applications per season. DO NOT apply to potatoes later than 2 days before harvest. For control of early blight, late blight, and botrytis vine rot in potato and for suppression of storage rots, pythium leak and pink rot, in potato *Bravo Zn* may be tank mixed with 80 mL per acre *Ridomil Gold 480 EC* or *Ridomil Gold 480 SL*.

Herbicides: On lentils, DO NOT apply in combination with *Poast* herbicide and *Merge* surfactant or within 48 hours of the application of *Poast* and *Merge*.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Lentil – DO NOT exceed 2 applications of this product per season. Wheat, pea, chickpea – DO NOT exceed 3 applications of this product per season. Potato (*Echo 90DF*) – DO NOT exceed 12 applications of this product per season.

Grazing: DO NOT graze treated areas. DO NOT feed straw from treated crop to livestock.

Preharvest interval: Potato - 1 day; Lentil - 48 days; Chickpea – *Bravo 500* - 14 days, *Echo 720* - 48 days; Wheat- 30 days; Pea - 32 days.

Re-cropping: None.

Re-entry: DO NOT re-enter treated area within 48 hours of application. If required, and at least 4 hours have passed since application, individuals may re-enter treated area for short-term tasks not involving hand labour. Long pants, long-sleeved shirt, and chemical resistant gloves must be worn.

Storage: DO NOT store near feed or food stuffs. Store in a cool, dry, ventilated place. Protect from excessive heat.

Environment: DO NOT apply if weather conditions favour drift from area being treated. DO NOT contaminate lakes, streams or ponds. Observe a buffer zone of 100 m for aerial applications and 15 m for ground applications to protect aquatic systems.

Hazard Rating:

☠ Caution – Poison.

⚠ Warning – causes severe eye damage.

For an explanation of the symbols used here see page 11.

Contans WG

Fungicide Group – Not classified, bio-fungicide.

Company:

Bayer CropScience, distributed by UAP - PCP#29066.

Formulation:

Wettable Granules - 5.30% *Coniothyrium minitans* strain CON/M/91-08. Contains minimum of 1×10^9 cfu per gram.

Container size - 20kg.

Crops, Diseases, Rates and Timing

Crop:	Diseases Suppressed:	Application Rate (per acre):	Application Timing:
Pre-plant - Soils where canola, sunflower, safflower, dry bean or soybean will be planted	White mould or stem rot (*Sclerotinia sclerotiorum*) and rots caused by *S. minor*	400 to 800 g	Prior to planting of spring crop; three months before the typical onset of sclerotinia white mould or stem rot. In fall, prior to spring planting of susceptible crop. After application to the soil, the product should be incorporated to within 5 cm of the top-soil. Incorporation should take place as soon as possible after application (within 1 week maximum).
		800 to 1600 g	If soil incorporation is to a depth greater than 5 cm, higher rate should be applied.
Post-harvest - On harvest residue of susceptible crops		200 to 400 g	Prior to the next soil treatment, the residues of the susceptible crops in rotation can be also treated to help reduce inoculum loads of sclerotia in the field.

Application Information:

Use sufficient water volumes to give thorough coverage of the soil surface and/or the crop residue (10 gallons per acre of water volume).

DO NOT allow spray mixture to stand overnight or for prolonged periods; should be used within 24 hours of being prepared.

After incorporation treated soils should not be disturbed to avoid bringing untreated sclerotia from lower soil depths to the top soil layer.

As part of an overall long term pest management strategy it is recommended to use other management practices along with *Contans* such as in season foliar fungicide applications and proper crop rotations.

DO NOT apply by air.

How it Works:

The active ingredient, *Coniothyrium minitans* is a fungus that infects the sclerotia of *Sclerotinia sclerotiorum* and *S. minor*. Infection of sclerotial bodies prevents production of ascospores and mycelial structures that infect plants. Regular use of *Contans* in successive years within a long-term management strategy will improve disease control.

Tank Mixes:

DO NOT tank-mix with fungicides or fertilizers. Also, DO NOT tank mix with acids, alkalis or any product that attacks organic materials. Contact Loveland Products Canada for more information on what products are compatible with *Contans*.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: No restrictions listed.

Grazing: No restrictions listed.

Preharvest interval: Can be applied up to and including the day of harvest.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Maximum storage period of one year at 4°C or below. Up to 6 weeks at temperatures between 4°C and 23°C. Store in a dry area inaccessible to children. Store in original container away from food or feed.

Environment: DO NOT apply this product directly to freshwater habitats, estuarine/marine habitats. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

▽ Caution – Potential sensitizer.

For an explanation of the symbols used here see page 11.

Copper

Fungicide Group – M1
(Refer to page 346)

Copper 53W/Copper Spray/Cueva/Parasol WG

Company:

W. Neudorff GmbH KG (*Cueva* – PCP# 31825), Distributed by Engage Agro Corporation

Loveland Products Canada, (*Copper 53W* – PCP#09934, Copper Spray – PCP#19146)

Nufarm Agriculture Inc. (*Parasol WG* – PCP#29063)

Formulations, Crops, Diseases, Rates and Timing:

Product		*Copper 53W*	*Copper Spray*	*Cueva*	*Parasol WG*
Formulation and Container Size		53% tribasic copper sulphate (wettable powder). 10 kg.	50% copper oxychloride (wettable powder). 10x2 kg	Copper as 1.8% copper octanoate (solution). 1-1000L.	50% elemental copper as copper hydroxide (wettable granule). 10 kg.
Crop	**Disease**	**Application Rate and Timing**			
Potato	Septoria leaf spot (*Septoria lycopersici*)	-	-	Use a 0.5% to 2% solution, applied at 190 – 380 L per acre. Apply 2 weeks before disease normally appears (make use of predictive disease models if available) and repeat using 5-10 day intervals.	-
	Early blight (*Alternaria soliani*)	2.2 kg per acre Apply when plants are 5 to 7 inches (12 to 18 cm) tall. Repeat at 7 day intervals.	1.6 kg per acre Apply when plants are 4 to 8 inches (10 to 20 cm) tall. Repeat at 7 to 10 day intervals.		0.44 to 1.0 kg per acre Apply when plants are 6 inches (15 cm) tall. Apply combined with 0.7 to 0.9 kg of mancozeb (80%) per acre, at 7 to 10 day intervals.
	Late blight (*Phytophthora infestans*)				
	Tuber blight (*Phytophthora infestans*)	-	-	-	1.36 kg per acre (vine kill). Apply with dessicant at vine kill or alone after vine kill, prior to harvest.

Continued

Formulations, Crops, Diseases, Rates and Timing *continued*:

Product		*Copper 53W*	*Copper Spray*	*Cueva*	*Parasol WG*
Dry beans	Anthracnose (*Colletotrichum truncatum*)	2.2 kg per acre. Apply prior to disease development or at the onset of disease	-	-	0.9 to 1.3 kg per acre. Apply prior to disease development or at the onset of disease
	Downy mildew (*Phytophthora phaseoli*)		-	-	-
	Common bacterial blight (*Xanthomonas campestris* pv. *phaseoli*), halo blight (*Pseudomonas syringae* pv. *phaseolicola*)			Use a 0.5% to 2% solution, applied at 190 – 380 L per acre. Apply 2 weeks before disease normally appears (make use of predictive disease models if available). Re-apply using 5-10 day intervals	
Dry beans, soybeans, field peas, lentils and chickpeas	Ascochyta blight (*Ascochyta pisi*), brown spot (*Pseudomonas syringae* pv. *syringae*), powdery mildew (*Erysiphe* spp.), rust (*Uromyces appendiculatus*)				

Application Information:

Aerial: DO NOT apply by air

Ground: Use enough water to ensure thorough coverage. As noted on the labels, 400 L per acre (*Copper 53W* and *Copper Spray*); boom height must be 60cm or less above the crop or ground (*Cueva*).

How it Works:

The active ingredients containing copper are inorganic fungicides with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: *Cueva*: DO NOT exceed 15 applications per year. Bean (*Parasol WG*) – DO NOT exceed 6 applications per season. Potato (*Parasol WG*) – DO NOT exceed 10 applications per season.

Grazing: No restrictions listed.

Preharvest interval: Do not apply within one day of harvest.

Re-entry: *Copper 53W, Copper Spray,* and *Parasol WG*: DO NOT re-enter treated areas within 48 hours of application; *Cueva*: 4 hours.

Re-cropping: No restrictions listed.

Storage: Store in original container in a cool, dry, well ventilated area. To prevent contamination store this product away from food or feed. Protect from freezing. Keep away from heat, fire, and sparks.

Environment: DO NOT apply or allow to drift onto streams or any body of water. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Avoid application when heavy rain is forecast. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Toxicity: Toxic to birds, small wild mammals and aquatic organisms (indicated on *Cueva* label).

Hazard Rating:

◈ Warning – Poison – (*Copper 53W, Copper Spray* labels)

▼ Caution – Poison – (indicated on *Parasol WG* label)

For an explanation of the symbols used here see page 11.

Curzate 60 DF

Fungicide Group – 27
(Refer to page 346)

Company

E.I du Pont Canada Company - PCP#26284

Formulation:

60% cymoxanil formulated as a dry flowable.

Container size - 1.8 kg

Crops, Diseases Timing:

Control of late blight (*Phytophthora infestans*) in potato. Initial applications should start when local conditions indicate that late blight is imminent. Make additional applications at 5 to 7 day intervals; however at least 20 days must pass between the 2nd and 3rd application.

Rate:

Apply *Curzate 60 DF* at 90 g per acre

Plus

Manzate DF or *Manzate Pro-Stick* at 540 g to 650 g per acre

Application Information:

Water Volume:

Ground: Utilize sufficient water to obtain thorough coverage - 80 to 400 L per acre.

Aerial: Apply by air with a minimum water volume of 20 L per acre.

How it Works:

The active ingredient cymoxanil is a cyanoacetamide-oxime fungicide with locally systemic activity. To be used as a preventative, curative and inhibitive (antisporulant) fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

DO NOT use *Curzate 60 DF* alone. Use only in a tank mix with *Manzate DF* or *Manzate Pro-Stick.*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 4 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 8 days

Re-entry: DO NOT re-enter treated area within 24 hours of application.

Re-cropping: No restrictions listed.

Storage: Store product in original container in a secure, dry area away from food or feed. Protect against humid air and water. Not for use or storage in or around the home. Keep container tightly closed.

Environment: A buffer zone of 50 m is required between the down-wind edge of the boom and sensitive aquatic habitats such as ponds, lakes, rivers, streams, and wetlands. DO NOT contaminate these habitats when cleaning and rinsing equipment or containers. DO NOT clean sprayer near well or water source or near desirable vegetation.

Hazard Rating:

☠ Danger – Poison.

▽ Caution – Eye irritant.

For an explanation of the symbols used here see page 11.

Delaro

Fungicide Group – 3, 11

(Refer to page 346)

Company:

Bayer CropScience – PCP#31533

Formulation:

175 g per L of prothioconazole and 150 g per L of trifloxystrobin formulated as a suspension concentrate.

Container size – 7.1 L

Crops, Diseases, Rates and Timing

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Field pea	Mycosphaerella blight (*Mycosphaerella pinodes*), ascochyta blight (*Ascochyta pisi*), white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	355 mL	Apply at the first sign of disease. When disease pressure is high or when agronomic or weather conditions are conducive to disease development, make a second application 10 to 14 days later. Use shorter intervals for best protection.
Chickpea	Ascochyta blight (*Ascochyta rabiei*), white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)		
Lentils	White mould (*Sclerotinia sclerotiorum*), ascochyta blight (*Ascochyta lentis*), grey mould (*Botrytis cinerea*), anthracnose (*Colletotrichum truncatum*)		
Soybean	Brown spot (*Septoria glycines*), phomopsis stem blight (*Phomopsis longicolla*), white mould (*Sclerotinia sclerotiorum*)	230 mL	Apply preventatively or at the first signs of disease from early flowering (R1) to complete pod fill (R5). When disease pressure is high or when agronomic or weather conditions are conducive to disease development, make a second application 10 to 14 days later. Continue applications as needed on a 10 to 14-day interval.

Application Information:

Water Volume:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient prothioconazole is a triazole fungicide with broad spectrum systemic activity. The active ingredient trifloxystrobin is a strobilurin fungicide with broad spectrum preventative activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered

Bayer CropScience supports the following mixes that are not on the *Delaro* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Centurion*

Insecticides: *Decis, Lorsban, Matador*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 2 applications of *Delaro* per season.

Grazing: No restrictions listed.

Preharvest interval: Field pea, chickpea, lentil – 30 days; soybean – 20 days

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: Crops listed on label, corn, cereals and sugarbeet may be planted immediately following last application. DO NOT plant any other crops within 30 days of application of Delaro.

Storage: Store this product away from food or feed. Keep away from fire or open flame or other sources of heat. Do not store at temperatures below freezing. If stored for 1 year or longer, shake well before using. Store away from feed, seed, fertilizer, plant and foodstuffs. Do not store in or around the home. Keep in original container during storage.

Environment: Toxic to aquatic organisms and non-target terrestrial plants. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. DO NOT apply to areas where runoff is likely to occur.

Hazard Rating:

▽ Caution – Eye Irritant

Potential Skin Sensitizer

For an explanation of the symbols used here see page 11.

Elatus

Fungicide Groups – 7 & 11

(Refer to page 346)

Company:

Syngenta Canada

Formulation:

The *Elatus* package has 2 components, formulated as wettable granules:

Elatus A Fungicide **(PCP #31973):** 250 g/L azoxystrobin

Elatus B Fungicide **(PCP #31977):** 100 g/L benzovindiflupyr

Crops, Diseases, Rates and Timing:

Crops:	Diseases:	Rate *Elatus A*	Rate *Elatus B*	Application Timing:
Chickpea	Ascochyta blight (*Ascochyta* spp.), and anthracnose (*Colletotrichum* spp.)	200 mL per acre	200 to 300 mL per acre	In pulse crops, the first application must be applied before disease is established and no later than the onset of flowering. A second application can be made 10 to 14 days later, if disease pressure is severe or conditions are conducive to disease development.
Dry bean	Ascochyta blight (*Ascochyta* spp.), and anthracnose (*Colletotrichum* spp.)			
Field pea	Ascochyta blight (*Ascochyta* spp.), and anthracnose (*Colletotrichum* spp.), mycosphaerella blight (*Mycosphaerella pinodes*), powdery mildew (*Microsphaera diffusa, Erisiphe pisi, E. polygoni*)			
Lentil	Ascochyta blight (*Ascochyta* spp.), and anthracnose (*Colletotrichum* spp.)			
Soybean	Control of: cercospora leaf spot (*Cercospora kikuchii*), powdery mildew (*Microsphaera diffusa, Erisiphe pisi, E. polygoni*), and septoria brown spot (*Septoria glycines*) Suppression of: frogeye leaf spot (*Cercospora sojina*) and pod and stem blight (*Diaporthe phaseolorum*)			Make first application at the R1 to R3 developmental stage or when there is a 5% disease level in the field. A second application may be made 14 days later, if conditions are conducive to disease development.

Application Information:

If disease pressure is high, use the highest rate and shortest application interval. For best results, use sufficient water volume to provide thorough coverage.

Ground: Minimum of 40 to 80 L per acre water volume is recommended.

Aerial: Minimum of 18 L per acre water volume is recommended.

Use sufficient water to obtain thorough coverage of plants. DO NOT apply under periods of dead calm. Avoid application of this product when winds are gusty.

How it Works:

The active ingredient azoxystrobin is a methoxyacrylate compound (strobilurin) broad spectrum contact and systemic activity with preventative and curative applications. The active ingredient benzovindiflupyr is a succinate dehydrogenase inhibitor (SDHI) fungicide with broad spectrum activity.

Tank Mixes:

The *Elatus* package has 2 components. Add *Elatus A* (SC) and any additional SC formulation mix partners prior to adding *Elatus B* (EC) and any additional EC formulation mix partners.

It is not recommended to combine solid (WG or DF) formulations with liquid tank mix partners within a single batch. Batch mix any WG or DF formulation mix partners before *Elatus A* (SC) and any additional SC formulation mix partners. Any SN or SL formulation mix partners should be added by induction or an additional batch mix after the EC (*Elatus B*) and any additional EC formulation mix partners.

Restrictions:

Note that *Elatus* contains 2 components with separate labels. Follow the most restrictive precautions, restrictions, and directions found on each of the *Elatus A* and *Elatus B* labels.

Resistance management: Refer to page 344.

Re-entry: DO NOT re-enter fields for 12 hours after application.

Maximum number of applications: DO NOT apply consecutive applications and DO NOT apply more than 2 applications per season.

Preharvest interval: DO NOT apply on pulse crops within 15 days of harvest. DO NOT apply on soybeans within 14 days of harvest.

Grazing: DO NOT feed dried pea vines to livestock.

Re-cropping: Potatoes, pulse crops (including dried pea and bean subgroup), soybeans, fruiting and curcurbit vegetables, cereals (wheat, barley, oats, rye, tricicale), corn, and rapeseed (including canola, mustard, flax, and borage) may be planted immediately after last application as long as they are also registered for use with azoxystrobin products. All other crops intended for food and feed may be planted 180 days after last application of *Elatus*.

Environment: DO NOT use to control aquatic pests. *Elatus A* is extremely phytotoxic to certain apple varieties. DO NOT use where spray drift may reach apple trees.

Exempla

Fungicide Groups – 3 & 11
(Refer to page 346)

Company:

Syngenta Canada – PCP#32015

Formulation:

225 g per L azoxystrobin and 225 g per L difenoconazole formulated as a suspension. Container size 2 x 9L.

Crops, Diseases, Rates and Timing:

Crops:	Diseases:	Rate	Application Timing:
Canola, rapeseed, Ethiopian mustard (*Brassica carinata*), mustard (all types), flax, camelina, borage	Sclerotinia stem rot (*Sclerotinia sclerotiorum*)	225 mL per acre	Make an application at 20 – 50% bloom. This treatment will also suppress alternaria black spot.
Canola, rapeseed, Ethiopian mustard (*Brassica carinata*), mustard (all types)	Black spot (*Alternaria brassicae, Alternaria raphani*)	225 mL per acre	For control make an application at the pod stage (90% petal fall).
Canola, rapeseed, Ethiopian mustard (*Brassica carinata*), mustard (all types)	Virulent blackleg (*Leptosphaeria maculans*)	133-225 ml per acre	Make an application during the rosette stage between 2nd true leaf and bolting with 2-6 leaf as optimal.**

Application Information:

Water volume: Use sufficient water to obtain thorough coverage.

Ground: Apply specified rates in 45-70 L/acre (110-170 L/ha) of water.

Aerial: Apply specified rates in a minimum of 18 L/ac (45 L/ha) of water.

** BlackLeg Timing: For HERBICIDE TANK MIXTURES: Apply specified rates in 20-45 L/ac (50-110 L/ha) of water.

How it Works:

The active ingredient azoxystrobin belongs to a strobilurin group of fungicides and difenconazole is a triazole fungicide. Together they provide broad spectrum preventative and systematic activity to be used as a preventative and curative fungicide application.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Re-entry: DO NOT re-enter fields for 12 hours after application.

Maximum number of applications: Do not apply more than 225 ml/ac per season of this product, which is equivalent to 1 application per season. Do not apply more than 125 gai/ha of difenoconazole-containing foliar products per season. Do not apply more than 500 gai/ha of azoxystrobin-containing products per season.

Preharvest interval: DO NOT apply within 30 days of harvest (30 day PHI).

Grazing: DO NOT feed dried pea vines to livestock.

Re-cropping: Do not plant any other crop for a period of 60 days following *Exempla* application to the preceding crop unless difenoconazole is registered for that crop.

Storage: STORE IN A COOL, DRY PLACE. Do not store food, beverages or tobacco products in storage area. Product may be frozen: allow product to thaw completely prior to use. In all cases, shake well or otherwise agitate thoroughly prior to use.

Environment: This product is toxic to aquatic organisms (or invertebrates), fish and mammals. Observe buffer zones outlined in the label.

Hazard Rating:

☠ Danger – Eye irritant.

For an explanation of the symbols used here see page 11.

Fontelis

Fungicide Group – 7
(Refer to page 346)

Company:

E.I. duPont – PCP#30331

Formulation:

200 g per L penthiopyrad formulated as a suspension. Container size – 4 x 3.79 L jug.

Crops, Diseases, Rates and Timing:

Crop:	Disease Controlled:	Application Rate (per acre)*:	Application Timing:
Alfalfa	Sclerotinia stem rot (*Sclerotinina sclerotiorum*)	500 to 700 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. Use higher rate and shorter interval when disease pressure is high.

Application Information:

Water Volume:
Ground: 45 L per acre.

Aerial: 16 L per acre.

Use sufficient water to obtain thorough coverage of plants. DO NOT apply under periods of dead calm. Avoid application of this product when winds are gusty.

How it Works:

The active ingredient penthiopyrad is a carboxamide fungicide with broad spectrum, locally systemic and curative properties recommended for foliar and soil borne plant diseases. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed two sequential applications of this product before switching to a fungicide with a different mode of action. DO NOT exceed 1.4 L per acre in one season.

Grazing: No restrictions listed.

Preharvest interval: 14 days.

Re-entry: DO NOT re-enter treated areas until 12 hours after application.

Re-cropping: Crops and crop groups on the *Fontelis* label as well as the following crops may be planted immediately after harvest: canola, cereal grains crop group, corn, cotton, legume vegetables crop subgroup, soybean, sugarbeet, tuberous and corm vegetables and leaves crop subgroup. All other crops cannot be planted until 12 months after the last application.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed.

Environment: This product is toxic to aquatic organisms. When using *Fontelis* consult the product label for buffer zones.

Hazard Rating:

Potential Skin Sensitizer.

Fullback 125SC

Fungicide Group – 3
(Refer to page 346)

Company:

FMC of Canada –PCP# 31679
Distributed by: Engage Agro Corporation

Formulation:

Flutriafol 125.08 g per L formulated as a suspension concentrate.

Crops, Timing, and Application Information:

Crop:	Disease:	Application Rate (per acre):	Application Timing:
Dry soybeans	Frogeye leaf spot (*Cercospora sojina*), Cercospora blight and leaf spot (*Cercospora kikuchii*), brown spot (*Septoria glycines*)	207 to 414 mL	Apply as a broadcast foliar spray to soybean plants in R3 growth stage (early pod fill) or when environmental conditions are favourable for disease development. Apply second application if conditions are conducive for heavy disease development. Use the higher rate and shorter spray interval under severe sustained disease pressure. Spray Interval 14 to 21 days

Application Information:

Water Volume: Minimum 40 L per acre.
ASABE medium droplets. Boom height must be 60 cm or less above the crop.

How it Works:

Flutriafol is a demethylation inhibitor with contact and systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

May be tank mixed with *Headline EC Fungicide* at the label rates for resistance management for Asian Soybean Rust.

Restrictions:

Resistance management: Refer to page 344.

Rainfall: Within 2 hours may reduce effectiveness.

Maximum number of applications: Do not apply more than 2048 mL per hectare per season. Do not apply more than 3 applications per growing season. Only one application at 1024 mL/ha may be made to any one field during a single growing season. Apply only to soybeans harvested for dry seed. Flutriafol is persistent and may carryover. It is recommended that any products containing flutriafol not be used in areas treated with this product during the previous season.

Grazing: Do not feed forage or hay to animals or permit animals to graze.

Preharvest interval: Do not apply within 21 days of harvest.

Re-entry: 12 hours.

Re-cropping: Labeled crops may be planted anytime. Field corn, popcorn may be planted 150 days after application and sweet corn may be planted 200 days after application. All other unlabeled crops may be planted 365 days after application.

Storage: Store unused product in original container in a cool, dry area. Do not contaminate water, food or feed by storage, disposal or cleaning of equipment. Shelf life of Fullback 125 SC is 3 years.

Environment: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. See label for more information on ground water contamination and surface water advisory. Avoid application when heavy rain is forecast. Toxic to aquatic organisms and non-target terrestrial plants. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Hazard Rating:

Potential Skin Sensitizer.

Keep out of reach of children and prevent access by unauthorized personnel.

Gavel 75 DF

Fungicide Group – 22, M3
(Refer to page 346)

Company:

Gowan Canada - PCP# 26842

Formulation:

66.7% mancozeb and 8.43% zoxamide formulated as a dry flowable. Container sizes - 13.6 kg.

Crops, Diseases and Timing:

Control of early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) in potato. Optimum disease control is achieved when the fungicide is applied in a regularly scheduled preventative spray program. Begin applications at the first sign of disease or when blight is reported in the area. Apply at 0.90 kg per acre every 7 days under high disease pressure when either disease is present or environmental conditions favour continued disease development.

Apply at 0.70 kg per acre every 7 days under low disease pressure and environmental conditions unfavorable for disease development.

Rate:

Apply at 0.70 to 0.90 kg per acre.

Application Information:

Thorough, uniform coverage is essential for good disease control.

Water Volume:

Ground: 90 L per acre.

Aerial: 18 to 36 L per acre. Use 36 liters of water under high disease pressure to provide better crop coverage.

How it Works:

To be used as a preventative fungicide application. The active ingredient zoxamide is a benzamide fungicide with contact activity. The mancozeb component is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 6 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 3 days.

Re-entry: DO NOT re-enter treated areas within 48 hours of application.

Re-cropping: A 30 day plant back interval (PBI) is required for leafy vegetables and root and tuber vegetables. For all other crops not included on the label, the PBI should be 140 days.

Storage: DO NOT allow product to freeze. Keep away from fire and sparks. Store in a cool, dry, well ventilated place away from feed or food.

Environment:
Ground application: a buffer zone of 25 m for application by ground sprayer should be established between the last spray swath and the edge of aquatic systems. A buffer zone of 5 m for application by ground sprayer should be established between the last spray swath and the edge of terrestrial habitats such as hedgerows, windbreaks, woodlots, vegetative strips and other vegetation. This pesticide is toxic to fish.
Aerial application: a buffer zone of 20 m is required between the downwind edge of the boom and the closest edge of sensitive aquatic habitats.

Hazard Rating:

▽ Caution – causes moderate eye irritation.

For an explanation of the symbols used here see page 11.

Headline EC

Fungicide Group – 11
(Refer to page 346)

Company:

BASF Canada – PCP# 27322

Formulation:

250 g per L of pyraclostrobin formulated as an emulsifiable concentrate.

Container size - Case (2 x 6.5 L); 120 L shuttle; 400 L tote.

Crops, Diseases, Rates, and Timing:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Wheat	Control of tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria tritici, S. nodorum*), leaf rust (*Puccinia recondita*)	120 to 240 mL	Apply single application immediately after flag leaf emergence; use higher rate to obtain extended protection; if disease persists or weather conditions are favourable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action. To maximize yields in cereals, it is important to protect the flag leaf from disease.
	Control of powdery mildew (*Erysiphe graminis* f. sp. *tritici*), spot blotch (*Cochliobolus sativus*), stripe rust (*Puccinia striiformis*)	160 to 240 mL	
Barley	Control of net blotch (*Pyrenophora teres*)	120 to 240 mL	
	Control of scald (*Rhynchosporium secalis*), spot blotch (*Cochliobolus sativus*), stripe rust (*Puccinia striiformis*)	160 to 240 mL	
Rye	Control of leaf rust (*Puccinia recondita*)	120 to 240 mL	
	Control of powdery mildew (*Erysiphe graminis*)	160 to 240 mL	
Oat	Control of crown rust (*Puccinia coronata*)	120 to 160 mL	
Canola, rapeseed, canola quality *Brassica juncea*, mustard (oilseed and condiment)	Control of black spot (*Alternaria brassicae, A. raphani*), blackleg (*Leptosphaeria maculans*)	120 to 160 mL	Apply in tank mix with supported canola herbicides to control blackleg at the 2 to 6-leaf (rosette) stage. Apply to control alternaria black spot at 20 to 50% bloom (suppression) to early pod stage (90% bloom) for control. Can be tank-mixed with *Lance WDG Fungicide* at 20 to 50% flower to control sclerotinia stem rot and suppress black spot.
Corn	Control of common rust (*Puccinia sorghi*)	160 to 240 mL	Begin all applications prior to disease development. If disease persists or weather conditions are favourable for disease development, apply a second time 10 to 14 days later with a fungicide that contains a different mode of action. Use higher rate and shorter interval when disease pressure is high.

Continued

Crops, Diseases, Rates, and Timing *continued*:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Chickpea	Control of ascochyta blight (*Ascochyta rabiei*)	160 to 240 mL Must be tank-mixed with 0.14 to 0.17 kg per acre *Lance WDG*	Apply a tank-mix of *Headline EC* with *Lance* at the beginning of flowering or the onset of symptoms. Ascochyta blight can develop quickly once established so early detection is essential. DO NOT apply sequential applications of this tank-mix; alternate to a fungicide with a mode of action other than Group 7 or 11 for at least one application.
Lentil	Control of anthracnose (*Colletotrichum truncatum*), ascochyta blight (*Ascochyta lentis*)	160 mL	Apply at the beginning of flowering or at the onset of symptoms for more aggressive diseases (anthracnose is lentils). If disease persists or weather conditions are favourable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action.
Field pea	Control of mycosphaerella blight (*Mycosphaerella* spp., *Ascochyta* spp.), powdery mildew (*Erysiphe* spp.)	160 mL	
	Control of downy mildew (*Peronospora viciae* f.sp. *pisi*)	160 to 240 mL	
Dry bean	Control of anthracnose (*Colletotrichum lindemuthianum*), powdery mildew (*Erysiphe* spp.), rust (*Uromyces* spp.)	160 mL	
Faba bean	Control of ascochyta blight (*Ascochyta fabae*), powdery mildew (*Erysiphe* spp.)	160 mL	
Sunflowers	Suppression of rust (*Puccinia helianthi*)	160 mL	Apply for optimum disease suppression prior to disease development. If disease persists or weather conditions are favourable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action.
Flax (including low-linolenic acid varieties)	Control of pasmo (*Septoria linicola*)	120 to 160 mL	Apply at the mid flower stage (7 to 10 days after the initiation of flowering). If disease persists or weather conditions are favourable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action.
Alfalfa (for seed production)	Control of common leaf spot (*Pseudopeziza medicaginis*)	160 mL	Apply at the beginning of flowering (10 to 30% bloom) or at the onset of disease.
Bluegrasses; fescues; ryegrasses (for seed production)	Control of leaf rust (*Puccinia recondita*), stem rust (*P. graminis*); suppression of powdery mildew (*Erysiphe graminis*)	160 to 270 mL	Apply prior to disease development; if disease conditions exist, apply again 12 to 14 days later with a fungicide that contains a different mode of action. Use higher rate and shorter interval when high disease pressure.
Potato*	Control of early blight (*Alternaria solani*)	180 to 270 mL	Apply prior to row closure or when conditions become favourable for disease development. Apply on a 7 to 14 day interval. Under high disease pressure, use higher rate or tank mix with *Bravo 500*. It is recommended that no more than 1 application of *Headline EC* is made before switching to a fungicide with an alternate mode of action.

Continued

Crops, Diseases, Rates, and Timing *continued:*

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Potato*	Control of late blight (*Phytophthora infestans*)	180 to 270 mL	Apply prior to row closure or when conditions become favourable for disease development. Apply on a 5 to 7 day interval. Under high disease pressure, use higher rate or tank mix with *Bravo 500*. If using a tank-mix, apply on a 7 to 10 day interval. DO NOT make more than 1 application of *Headline EC* before switching to a fungicide with an alternate mode of action.
Timothy hay**	Control of brown stripe (*Cercosporidium graminis*), leaf streak (*Drechslera phlei*), and purple eye spot (*Cladosporium phlei*)	162 to 271 mL	Apply prior to disease development. Use higher rate when disease pressure is high. If disease persists or weather conditions are favourable for disease development, apply a second time 14 days later, with a fungicide with a different mode of action. In absence of an alternative fungicide registered for the specific diseases to be treated, for resistance management purposes, the maximum number of applications is limited to one. DO NOT apply more than 162 mL per acre by aerial application.

* BASF Canada does not recommend use of *Headline EC* alone on potato due to potential for fungicide resistance.

** Minor use label expansion.

Application Information:

Water Volume:

Ground: Use a minimum water volume of 40 L per acre on oilseeds, cereals, pulses, alfalfa and grasses; use 80 L per acre on potatoes. Ensure thorough coverage of foliage.

Aerial: Use a minimum water volume of 20 L per acre. Ensure thorough coverage of foliage. DO NOT apply more than 160 mL per acre by aerial application.

Pivot or Sprinkler irrigation: DO NOT exceed 0.64 cm (1/4 inch) (63,500 L) per hectare. DO NOT apply registered tank mixes in potato, chickpea, and canola by pivot or sprinkler irrigation. Apply only through overhead sprinkler systems including centre pivot and lateral move containing low pressure drop nozzles.

How it Works:

The active ingredient pyraclostrobin is a strobilurin fungicide with broad spectrum contact and systemic activity. To be used as a preventative application when environmental conditions are favourable for disease development. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Herbicides: *Headline EC* at a rate of 120 to 160 mL per acre can be tank mixed with *Odyssey* on canola quality *Brassica juncea* with Clearfield trait, *Ares*, *Odyssey*, *Odyssey DLX*, and *Tensile* on Clearfield canola, *Liberty Herbicide* (150SN or 200SN) in glufosinate ammonium tolerant canola (eg: LibertyLink canola), registered glyphosate herbicides in glyphosate tolerant canola (eg: Roundup Ready), *Poast Ultra* in canola, and *Equinox EC* in canola and canola quality *Brassica juncea*.

Fungicides: On chickpea, *Headline EC* at a rate of 160 to 240 mL per acre must be applied in tank-mix with 140 to 170 grams per acre *Lance* for control of ascochyta blight. On potatoes, *Headline EC* at rates of 180 to 270 mL per acre may be applied in tank-mix with *Bravo 500* at label rates, additional use recommendations, restrictions, and precautions for the control of late blight. On canola, *Headline EC* can be tank mixed with *Lance Fungicide* at 142 grams per acre at 20 to 50% flowering to control sclerotinia stem rot and suppress black spot.

Restrictions:

Resistance management: Refer to page 344.
Note: BASF does not recommend use of *Headline* alone on potato due to potential for resistance.

Maximum Number of Applications: DO NOT exceed 1 sequential application of this product per season. Any subsequent applications of this product must be in combination with a fungicide that contains a different mode of action. Alfalfa – DO NOT exceed 1 application of this product per season. Canola, rapeseed, canola quality *Brassica juncea*, mustard, flax, dry bean, faba bean, lentil, field pea, chickpea, bluegrass, fescue grass, ryegrass, corn, sunflower – DO NOT exceed 2 applications of this product per season. Potato – DO NOT exceed 3 applications of this product per season.

Grazing: DO NOT graze treated corn crops within 6 days of last application. DO NOT feed alfalfa hay or forage to livestock. All other crops listed can be grazed or fed to livestock.

Preharvest interval: Barley, rye, wheat, oat – apply no later than the end of flowering, Corn – 7 days, Pulses – 30 days, Forage grasses – 14 days, Alfalfa -not applicable, Oilseeds – 21 days, Potatoes – 3 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: Crops listed on label may be planted immediately following last application. Wait 14 days before planting all other crops.

Storage: Store in a cool, dry, locked, well-ventilated area without a floor drain. DO NOT freeze.

Environment: Avoid overspray or drift to sensitive habitats. Maintain specified buffer zones. DO NOT spray non-target terrestrial or aquatic habitats.

Hazard Rating:

☠ Danger Poison – Skin and eye irritant.

For an explanation of the symbols used here see page 11.

Inspire

Fungicide Group – 3
(Refer to page 346)

Company:

Syngenta Canada – PCP #30004

Formulation:

250 g per L difenoconazole formulated as an emsulfiable concentrate.

Container size – 4x1.12 L.

Crops, Diseases, Rates, and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Potato	Early blight (*Alternaria solani*)	120 to 205 mL	Begin application at first sign of disease of when conditions are conducive for disease development. Repeat application 7 to 14 days after the first application. Maximum 2 consecutive applications before rotating to fungicide with another mode of action. Under severe disease pressure, use higher rate at 7 day interval.

* DO NOT apply more than 825 mL per acre per season. DO NOT apply *Inspire* or other products containing difenoconazole more than one year out of two.

Application Information:

Water Volume:

Ground: Minimum of 60 L per acre.

Aerial: Minimum of 18 L per acre.

Consult nozzle manufacturers for specific nozzle and pressure recommendations. DO NOT apply this product through any type of irrigation system.

How it Works:

The active ingredient difenoconazole is a triazole fungicide with broad spectrum, systemic activity. To be used as a preventative and curative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides: *Inspire* may be mixed with *Revus* (also available as co-pack *Revus Top*). DO NOT make more than 4 applications of this tank mix per season.

Inspire may be mixed with *Bravo 500*.

Restrictions:

Resistance management: Refer to page 344.

Preharvest interval: DO NOT apply within 14 days of harvest.

Re-entry: DO NOT re-enter treated area within 12 hours after application.

Re-cropping: DO NOT plant any other crop for a period of 60 days after application unless *Inspire* is registered for that crop.

Storage: Store in cool, dry place. DO NOT store near food, beverages, or tobacco products.

Environment: This product is toxic to aquatic organisms and certain beneficial insects. Buffer zones of 11 m must be left from the downwind edge of the boom to the sensitive habitats. Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy. Avoid run-off from treated areas into aquatic habitats by including a vegetative strip between the edge of the treated area and the water body.

Hazard Rating:

⚠ Warning – causes severe eye damage.

Check label for first-aid information.

For an explanation of the symbols used here see page 11.

Iprodione

Fungicide Group – 2
(Refer to page 346)

Rovral Flo / Overall 240 SC

Company:

FMC of Canada (*Rovral Flo* - PCP#29315)
ADAMA Canada (*Overall 240 SC* - PCP#30275)

Formulation:

240 g per L iprodione formulated as a suspension. Container size - 8.4 L.

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Canola	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*) and suppression of alternaria black spot (*Alternaria brassicae, A. raphani*)	**Single application*:** 0.85 to 1.25 L **Split application*:** 0.42 to 0.63 L at 20% bloom; followed by 0.42 L at 50% bloom. **Single application for low disease pressure (Sclerotinia stem rot) and light crop stands:** 0.63 L	Apply at 20 to 50% bloom stage (approximately 4 to 8 days after crop begins to flower). Best protection achieved when applied at the 20 to 30% bloom stage (prior to petal fall). Can be applied until 50% bloom stage (when crop is at its maximum yellow color and prior to significant petal fall).
	Control of alternaria black spot (*Alternaria brassicae, A. raphani*)	**Single application:** 0.85 L **Split applications:** 0.42 L each application.	**Single application:** Apply at early green pod stage. **Split application:** Apply first application at 20 to 50% bloom, followed by second application at early green pod stage.
Alfalfa (grown for seed)	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	0.85 to 1.25 L*	Make a single application at the 20 to 50% bloom stage.

* Lower rate recommended for most crops; use higher rate for fields with history of severe disease pressure and dense crop stands.

Application Information:

Water Volume: Good coverage of the plants is essential.
Ground: 40 L per acre
Air (canola only): Minimum of 18 L per acre

How it Works:

The active ingredient iprodione is a dicarboximide fungicide with contact activity. To be used as a preventative and eradicant fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 2 applications of this product per season.

Grazing: DO NOT use treated alfalfa for animal feed.

Preharvest interval: 38 days.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Do not freeze.

Environment: DO NOT apply directly to water. DO NOT contaminate sensitive areas through spray drift, direct application, disposal of waste or cleaning equipment. Observe specified buffer zones.

Hazard Rating:

☠ Caution – Poison.

⚠ Warning – Skin and Eye Irritant.

For an explanation of the symbols used here see page 11.

Lance AG

Fungicide Group – 7, 11

(Refer to page 346)

Lance AG **is a co-pack of** ***Lance WDG Fungicide*** **(boscalid fungicide, page 382) and** ***Headline EC*** **(pyraclostrobin fungicide, page 374). For other detailed information on the component products see the product pages listed above.**

Company:

BASF Canada (*Lance WDG Fungicide* – PCP#27495; *Headline EC*- PCP# 27322)

Formulation:

Lance WDG Fungicide: 70% boscalid formulated as a water dispersible granular. Container size – 2 x 2.83 kg per case.

Headline EC: 250 g per L of pyraclostrobin formulated as an emulsifiable concentrate. Container size – case (2 X 6.5 L); 120 L shuttle; 400 L tote.

Crops, Diseases, Rates and Timing:

(Ground, Aerial, and Pivot or Sprinkler Irrigation Applications)

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Canola (including rapeseed, canola quality *B. juncea* and oilseed/ condiment mustard	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*); suppression of alternaria black spot	140 g per acre *Lance WDG Fungicide* and 132 mL per acre *Headline EC.*	Apply at 20 to 50% flowering. Apply every 7 to 14 days if disease persists, or weather conditions are favourable for disease development.
Pea *	Control of ascochyta blight (*Ascochyta* spp.), mycosphaerella blight (*Mycosphaerella pinodes*, grey mold (*Botrytis cinerea*), powdery mildew (*Erysiphe* spp.); suppression of downy mildew	175 g per acre *Lance WDG Fungicide* and 165 mL per acre *Headline EC.*	Apply at 20 to 50% flowering. Apply a second time 7 to 14 days later up to full bloom if disease persists, or weather conditions are favourable for disease development.

Continued

Crops, Diseases Controlled, Rates and Timing *continued*:

Lentil	Control of anthracnose (*Colletotrichum truncatum*), ascochyta blight (*Ascochyta lentis*), white mold (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	175 g per acre *Lance WDG Fungicide* and 165 mL per acre *Headline EC.*	Apply at the beginning of flowering or at the onset of symptoms. A second application can be applied 10 to 14 days after first application.
Chickpea	Control of ascochyta blight (*Ascochyta rabiei*), white mold (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	175 g per acre *Lance WDG Fungicide* and 165 mL per acre *Headline EC.*	Apply at the beginning of flowering or at the onset of symptoms. If diseases persist or weather conditions are favorable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action.
Alfalfa (for seed production only)	Control of common leaf spot (*Pseudopeziza medicaginis*), blossom blight (*Sclerotinia sclerotiorum, Botrytis cinerea*), spring black stem (*Phoma medicaginis*), leaf spot (*Leptosphaeruloina briosiani*)	175 g per acre *Lance WDG Fungicide* and 165 mL per acre *Headline EC.*	Apply at 10 to 30% bloom or at the onset of symptoms. If diseases persist or weather conditions are favorable for disease development, apply a second application 10 to 14 days later with a fungicide that contains a different mode of action.
Sunflowers	Suppression of sclerotinia head rot (*Sclerotinia sclerotiorum*), suppression of leaf spot (*Alternaria helianthi*), suppression of rust (*Puccinia helianthi*)	140 to 256 g per acre *Lance WDG Fungicide* and 160 mL per acre *Headline EC*	Apply at early flower. Use higher rate when disease pressure is high or there is a history of high disease in the field.

* Do not apply by air

Application Information:

Water Volume:

Aerial: Use a minimum volume of 20 L per acre and ensure thorough coverage of foliage.

Ground: Use a minimum volume of 40 L per acre and ensure thorough coverage of foliage.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Alfalfa – Do not exceed one application of this product per season. All other crops do not exceed 2 applications per season and rotate applications with a fungicide that contains a different mode of action.

Grazing: Do not feed alfalfa hay or forage to livestock. All other crops on this label can be grazed – follow pre-harvest interval.

Preharvest interval: 30 days (Field pea, lentil, chickpea, fababean); 21 days (canola, sunflower); alfalfa – not applicable.

Re-entry: DO NOT re-enter treated areas until 12 hours after application.

Re-cropping: All labelled crops and the tuberous and corm vegetables, fruiting vegetables, pome fruits and stone fruits may be planned immediately following the last application. A plant back restriction of 14 days for all other crops not on label.

Storage: Store in a cool, dry, locked, well-ventilated area away from food or feed.

Environment: Do not apply to any water body. Toxic to aquatic organisms and non-target terrestrial plants. Observe buffer zones outlined in the label.

Hazard Rating:

☠ Caution Poison – Potential Skin Sensitizer.

◇ Warning – Eye Irritant.

For an explanation of the symbols used here see page 11.

Lance WDG Fungicide

Fungicide Group – 7
(Refer to page 346)

Company:

BASF Canada – PCP# 27495

Formulation:

70% boscalid formulated as a water dispersible granular.
Container size - 2 x 2.83 kg per case.

Crops, Diseases, Rates and Timing:

(Ground, Aerial, and Pivot or Sprinkler Irrigation Applications)

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Alfalfa (seed production only)	Control of blossom blight (*Sclerotinia sclerotiorum, Botrytis cinerea*), common leaf spot (*Pseudopeziza medicaginis*), spring black stem (*Phoma medicaginis*), leaf spot (*Leptosphaerulina briosiani*)	170 g	Apply at 20 to 50% flowering. Apply every 7 to 14 days if disease persists, or weather conditions are favourable for disease development.
Canola, mustard (oilseed and condiment)	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	140 g	Apply at 20 to 50% flowering. Apply a second time 7 to 14 days later up to full bloom if disease persists, or weather conditions are favourable for disease development.
	Control of black spot (*Alternaria brassicae* and *A. raphani*)	140 g	Apply at late flowering to early green pod.
Dry bean, faba bean	Control of white mould (*Sclerotinia sclerotiorum*)	225 to 310 g	Apply at 20 to 50% flowering. Apply a second time 7 to 14 days later if disease persists, or weather conditions are favourable for disease development. Use the higher rate to obtain extended protection and maximum yield benefit.

(Ground and Aerial Applications)

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Chickpea*, lentil	Control of ascochyta blight (*Ascochyta* spp.), white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	170 g	Apply at the beginning of flowering. Apply a second time 7 to 14 days later if disease persists, or weather conditions are favourable for disease development.
Sunflower	Suppression of sclerotinia head rot (*Sclerotinia sclerotiorum*), leaf spot (*Alternaria helianthi*)	140 to 260 g	Apply at early flower for optimal disease suppression. Use the higher rate when disease pressure is high or there is a history of high disease in the field.

* For the control of ascochyta blight in chickpea, *Lance* should be mixed with 160 to 240 mL per acre *Headline EC*.

Continued

Crops, Diseases Controlled, Rates and Timing *continued*:

(Ground Application Only)

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Pea**	Control of ascochyta blight (*Ascochyta* spp.), mycosphaerella blight (*Mycosphaerella pinodes*), grey mould (*Botrytis cinerea*)	170 g	Apply at the beginning of flowering. Apply a second time 7 to 14 days later if disease persists, or weather conditions are favourable for disease development.

** DO NOT apply by air

Application Information:

Water Volume:

Aerial (registered for all crops but peas): Use a minimum water volume of 16 L per acre and ensure thorough coverage of foliage.

Ground: Use a minimum water volume of 40 L per acre and ensure thorough coverage of foliage.

Pivot and Sprinkler Irrigation: DO NOT exceed 0.64 cm (1/4 inch) or 25,700 L per acre. Apply only through sprinkler systems including centre pivot, lateral move, end two, side (wheel) roll, traveler, big gun, solid set, or hand move irrigation systems.

How it Works:

The active ingredient boscalid is a carboxamide (SDHI) fungicide with systemic activity. To be used as a preventative application when environmental conditions are favourable for disease development. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Insecticides: For control of corn borer in succulent beans, *Lance* can be tank-mixed with *Matador 120 EC* at 37 mL per acre.

Fungicides: For the control of ascochyta blight on chickpea, *Lance* at rate of 140 to 170 g per acre should be applied with 160 to 240 mL per acre *Headline EC*.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Sunflower – DO NOT exceed 1 application of this product per season. Canola, mustard, dry bean, chickpea, lentil, pea – DO NOT exceed 2 applications of this product per season. Alfalfa – DO NOT exceed 3 applications of this product per season.

Grazing: All crops except alfalfa (grown for seed) can be grazed or fed to livestock.

Preharvest interval: Beans, canola, chickpea, lentil, pea - 21 days; alfalfa - not applicable.

Re-entry: DO NOT re-enter treated area for 12 hours after application or until dry.

Re-cropping: A plant back restriction of 14 days is required for all crops not on the label.

Storage: Store in a cool, dry, locked, well-ventilated area without a floor drain.

Environment: DO NOT apply to any body of water. Avoid drifting of spray onto any body of water or other non-target areas. Specified buffer zones should be observed

Hazard Rating:

Caution Poison – Potential Skin Sensitizer.

Warning – Eye Irritant.

For an explanation of the symbols used here see page 11.

Luna Tranquility

Fungicide Group – 7, 9
(Refer to page 346)

Company:

Bayer CropScience – PCP#30510

Formulation:

125 g per L fluopyram + 375 g per L pyrimethanil formulated as a suspension concentrate.

Container size – 2 x 4.86 L.

Crops, Diseases, Rates, and Timing:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Potato	Control of early blight (*Alternaria solani*), brown leaf spot (*Alternaria alternata*)	245 mL	Begin fungicide applications preventatively. Continue as needed on a 7 to 14 day interval. When disease pressure is severe, use the shorter intervals.
	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*), suppression of black dot (*Colletotrichum coccodes*)	325 mL	

Application Information:

Ground: Use a minimum water volume of 80 L per acre and ensure thorough coverage of foliage.

Aerial: Use a minimum water volume of 20 L per acre and ensure thorough coverage of foliage.

How it Works:

The active ingredient fluopyram is a carboxamide fungicide with systemic activity. The active ingredient pyrimethanil is a anilinopyrimidine fungicide with contact and systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT apply more than 1.3 L per acre of this product per season.

Grazing: No restriction listed.

Pre-harvest interval: 7 days.

Re-entry: DO NOT re-enter treated areas until 12 hours after application.

Re-cropping: A plant back restriction of 30 days is required for canola, cereal grains, corn, soybean, dry bean, chickpea, lentil, and alfalfa.

Storage: Do not store below freezing. If stored for one year or longer, shake well before using. Store the tightly closed container away from feeds, seeds, fertilizer, plants and foodstuffs. Keep the product in the original container during storage.

Environment: Toxic to aquatic organisms and birds. DO NOT apply directly to water, to areas where surface water is present, or to intertidal areas below the high water mark. non-target areas. Observe buffer zones outlined in the label.

Hazard Rating:

None listed.

Mancozeb

Fungicide Group – M3
(Refer to page 346)

Dithane Rainshield/Kingpin 75 WDG/Manzate Pro-Stick/Penncozeb 75 DF

Company:

FMC of Canada (*Kingpin 75 WDG* – PCP#31281)

Dow AgroSciences (*Dithane Rainshield* – PCP#20553)

United Phosphorus Inc (*Manzate Pro-Stick* – PCP#28217, *Penncozeb 75 DF* – PCP#25397)

Formulations:

Dithane Rainshield - 75% mancozeb formulated as a water dispersible granule. Container size - 3.5 to 544 kg.

Kingpin 75 WDG - 75% mancozeb formulated as a water dispersible granule. Container size - 20 kg.

Manzate Pro-Stick - 75% mancozeb formulated as a dry flowable. Container sizes - 10 to 20 kg.

Penncozeb 75 DF - 75% mancozeb formulated as a wettable granule. Container sizes - 2.5 to 250 kg.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Potato	Early blight (*Alternaria solani*), late blight (*Phytophthora infestans*)	0.45 to 0.9 kg	Apply at 0.45 kg per acre rate when plants are 10 to 15 cm high; increase to 0.7 kg per acre as plants increase in size, and 0.9 kg per acre at row closure. Apply every 7 to 10 days. Spray interval may be reduced to 5 to 6 days during periods of wet weather favouring late blight and/or vigorous crop growth.
Wheat	Tan spot (*Pyrenophora tritici-repentis*), leaf rust (*Puccinia recondita*), septoria leaf blotch (*Septoria tritici*)	0.45 to 0.9 kg	Apply 0.45 kg per acre early (when crop is in the 3-leaf to tillering stage); apply 0.9 kg per acre later (when head is fully emerged, but prior to flowering).
Lentil	Anthracnose (*Colletotrichum truncatum*), ascochyta blight (*Ascochyta lentis*)	0.9 kg	Apply first application before flower when bud formation is evident; apply second application 10 to 14 days later at early to mid-bloom but prior to row closure. A third application may be applied 10 to 14 days later.
Alfalfa (for seed)	Leaf and stem spot diseases (*Pseudopeziza medicaginis*)	0.6 kg	Apply first application prior to 50% bloom; apply second application 7 to 10 days later; apply third application 10 days after second.

Application Information:

Water Volume:

Thorough uniform coverage is essential for good disease control.

Ground: 40 L per acre (wheat); 40-80 L per acre (lentil).

Air: 16 L per acre (wheat, lentil, potato).

How it Works:

The active ingredient mancozeb is a dithiocarbamate fungicide with multi-site contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides (potato only): For late blight control, *Manzate Pro-stick* and *Kingpin 70 WDG* can be tank-mixed with *Curzate 60 DF*.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Wheat – DO NOT exceed 2 applications of this product per season. Lentil, alfalfa – DO NOT exceed 3 applications of this product per season.

Grazing: DO NOT graze or feed treated crop or straw to livestock. DO NOT graze or cut treated alfalfa for hay.

Preharvest interval: Potato - 1 day; Lentil - 35 days; Wheat - 40 days

Re-entry: DO NOT re-enter treated areas within 24 hours of application.

Re-cropping: No restrictions listed.

Storage: Store in cool, dry, well-ventilated place. Keep away from fire and sparks.

Environment: Toxic to aquatic organisms. DO NOT contaminate any body of water by direct application, drift or by cleaning equipment.

Hazard Rating:

☠ Warning – Poison.

☠ Danger – Eye irritant.

For an explanation of the symbols used here see page 11.

Phosphorous acid

Fungicide Group – 33

(Refer to page 346)

Company:

Loveland Products Canada (Rampart - PCP #30654)
Winfield Solutions (Confine Extra - PCP #30648)
Canadian Agent: The Agronomy Company of Canada
Distributed by: Univar

Formulation:

53.0% mono- and di-potassium salts of phosphoric acid

Container size – Confine Extra 9.46 to 946.35 L ; Rampart 9.46 L.

Crops, Diseases, Rates and Timing

Crop:	Diseases Suppressed:	Application Rate (per acre):		Application Timing:
		Confine Extra	*Rampart*	
Potato*	Late blight (*Phytophthora infestans*), pink rot (*Phytophthora erythroseptica*)	2 to 4 L	1.2 to 3.2 L	Begin applications when conditions are favourable for disease and continue on a 7-14 day interval. Use the higher rate and shorter application interval when disease pressure is moderate to high. Use a maximum of 5 foliar and/or chemigation ** applications per growing season.

* Not recommended for use on potatoes intended for seed.
** Chemigation application for Confine Extra only.

Application Information:

Water Volume:

Ground: **Confine Extra** - minimum of 40 L per acre; **Rampart** - minimum 120 L per acre.

Aerial: Minimum of 40 L per acre when applying Rampart by air. DO NOT apply Confine Extra by air.

How it Works:

The active ingredient mono- and di-potassium salts of phosphorous acid is a phosphonate fungicide with system- ic activity to suppress pathogen inoculum. To be used as a preventative fungicide application on harvested tubers. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Preharvest interval: DO NOT apply within 1 day of harvest.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: DO NOT store near food or feed.

Environment: DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of waste.

Hazard Rating:

▽ Caution – Eye irritant.

For an explanation of the symbols used here see page 11.

Phostrol

Fungicide Group – 33

(Refer to page 346)

Company:

Engage Agro Corporation – PCP#30449

Formulation:

53.6% mono- and dibasic sodium, potassium, and ammonium phosphites formulated as a liquid flowable.

Container size - 2 x 10 L and 1000 L

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate	Application Timing:
Potato	Suppression of pink rot (*Phytophthora erythroseptica*)	2.3 to 4.7 L per acre	In furrow: Apply in a band at planting directly over the seed pieces prior to row closure.
	Control of late blight (*Phytophthora infestans*)	1.2 to 4.7 L per acre	Foliar applications: For preventative control of late blight and preventative suppression of pink rot begin applications when conditions favouring disease development exist and continue on a 7 to 14 day interval.
	Suppression of pink rot (*Phytophthora erythroseptica*)	2.3 to 4.7 L per acre	
	Control of late blight (*Phytophthora infestans*), pink rot (*Phytophthora erythroseptica*)	0.42L in 2L water to 1 tonne tubers	Post harvest control: Apply directly to the tubers and ensure complete and even coverage.

Application Information:

Water Volume:

Ground: Minimum of 12 L per acre for in-furrow treatment and minimum of 81 L per acre for foliar applications.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient mono- and dibasic sodium, potassium, and ammonium phosphite is a phosphonates fungicide with systemic activity to suppress pathogen inoculum. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Pink rot: *Ridomil Gold 480SL* (in furrow), *Ridomil Gold MZ* and *Ridomil Gold Bravo Twin Pack* (foliar)

Late Blight: May be tank mixed with one of the following fungicides: *Bravo 500, Bravo ZN, Echo 720, Echo 90DF, Ridomil Gold Bravo Twin Pack, Dithane Rainshield, Manzate Pro-Stick, Gavel 75DF, Penncozeb 75DF*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Do NOT exceed 7 applications of this product per season

Grazing: Do NOT graze treated fields or feed treated forage to livestock.

Preharvest interval: May be applied up to the day of harvest and post harvest.

Re-entry: Re-entry interval after application is 12 hours.

Re-cropping: No restriction listed.

Storage: Store in original tightly closed container.

Environment: Avoid run-off from treated areas into aquatic areas.

Toxicity: Toxic to aquatic organisms, non-target terrestrial plants and small wild animals.

Hazard Rating:

▽ **Caution – Skin irritant.**

For an explanation of the symbols used here see page 11.

Polyram DF

Fungicide Group – M3

(Refer to page 346)

Company:

BASF Canada – PCP#20087

Formulation:

80% metiram formulated as a water dispersable granule.
Container size – 1 to 25 kg

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rates and Timing:
Potato	Late blight (*Phytophthora infestans*), early blight (*Alternaria solani*)	Apply at 7 to 10 day intervals using 445 to 705 g per acre until plants cover row. Then increase the rate to 910 g per acre until tops are killed. Or Apply at 5 to 7 day intervals using 445 to 705 g per acre starting when plants are 15 cm high and continuing until tops are killed. With either option, use the shorter intervals when conditions are favourable for infection.

Application Information:

Water Volume:

Ground: None listed.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient metiram is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Preharvest interval: DO NOT apply within 1 day of harvest.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store in original, tightly-closed container. DO NOT store near food, feed, seed, or fertilizers. Store in cool, dry, locked, well-ventilated area without floor drain.

Environment: DO NOT apply to any body of water. Avoid drifting of spray onto any body of water or non-target area. Specific buffer zones should be observed.

Hazard Rating:

Potential skin sensitizer

Priaxor

Fungicide Group – 7, 11
(Refer to page 346)

Company:

BASF Canada – PCP#30567

Formulation:

167 g per L of fluxapyroxad and 333 g per L of pyraclostrobin formulated as a suspension concentrate.

Container size – 2 x 9.6

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre)	Application Timing:
Wheat, triticale	Control of tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria tritici; S. nodorum*), leaf rust (*Puccinia recondita*), spot blotch (*Cochliobolus sativus*), stripe rust (*P. striiformis*), powdery mildew (*Erysiphe graminis* f. sp. *tritici*)	90 to 120 mL	Apply prior to disease development or at the onset of disease symptoms. Applications should be made prior to head emergence. Use the higher rate when disease pressure is high.
Barley	Control of net blotch (*Pyrenophora teres*), spot blotch (*Cochliobolus sativus*), scald (*Rhynchosporium secalis*), stripe rust (*Puccinia striiformis*)		
Rye	Control of leaf rust (*Puccinia recondita*), powdery mildew (*Erysiphe graminis*)		
Oat	Control of crown rust (*Puccinia coronata*)		
Corn	Control of common rust (*Puccinia sorghi*), northern leaf blight (*Setosphaeria turcica*)	120 mL	Apply prior to disease development.
Canola (including rapeseed, canola quality *Brassica juncea*) and mustard (oilseed and condiment)	Control of blackleg (*Leptosphaeria maculans*)	90 to 120 mL	Apply at 2 to 6 leaf (rosette) stage. Use the high rate under high disease pressure.
	Control/suppression of black spot (*Alternaria brassicae, A. raphani*)	90 to 120 mL	Apply at 20-50% bloom for suppression. For control, apply at early pod stage. Use the high rate under high disease pressure.
	Suppression of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	180 mL	Apply at 20-50% bloom.
Chickpea	Control of ascochyta blight (*Ascochyta rabiei*)	120 to 180 mL	Apply at the beginning of flowering or at the onset of symptoms.
	Suppression of white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	180 mL	Apply at the beginning of flowering.
Lentil	Control of anthracnose (*Colletotrichum truncatum*)	120 mL	Apply at the beginning of flowering or at the onset of symptoms.
	Control of ascochyta blight (*Ascochyta lentis*)	120 to 180 mL	
	Suppression of white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	180 mL	Apply at the beginning of flowering.

Continued

Crops, Diseases Controlled, Rates and Timing *continued*:

Crop:	Diseases:	Application Rate (per acre)	Application Timing:
Faba bean	Control of powdery mildew (*Erysiphe* spp.)	120 mL	Apply at the beginning of flowering or at the onset of symptoms.
	Control of ascochyta blight (*Ascochyta* spp.)	120 to 180 mL	
	Suppression of white mould (*Sclerotinia sclerotiorum*), grey mould (*Botrytis cinerea*)	180 mL	Apply at the beginning of flowering.
Field pea	Control of powdery mildew (*Erysiphe pisi*)	120 mL	Apply at the beginning of flowering or at the onset of symptoms.
	Control of mycosphaerella blight (*Mycosphaerella pinodes*); suppression of downy mildew (*Perenospora viciae* f.sp. *pisi*)	120 to 180 mL	For control of Mycosphaerella blight and suppression of white mould apply at the beginning of flowering. For suppression of downy mildew, apply at the beginning of flowering or at the onset of symptoms.
	Suppression of white mould (*Sclerotinia sclerotiorum*)	180 mL	
Dry bean	Control of anthracnose (*Colletotrichum lindemuthianum*), powdery mildew (*Erysiphe* spp.), rust (*Uromyces appendiculatus*)	120 mL	Apply at the beginning of flowering.
Soybean	Control of septoria brown spot (*Septoria glycines*)	97 to 120 mL	Apply prior to disease development when conditions are favourable for disease development. Use the high rate when disease pressure is high.
	Suppression of white mould (*Sclerotinia sclerotiorum*)	180 mL	
Sunflowers	Suppression of leaf rust (*Puccinia helianthi*)	120 mL	Apply at first sign of disease.
Flax	Control of pasmo (*Septoria linicola*)	90 to 120 mL	Apply at 20-50% flowering.
	Suppression of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	180 mL	
Alfalfa (for seed production)	Control of common leaf spot (*Pseudopeziza medicaginis*)	120 mL	Apply at the beginning of flowering (10 to 30% bloom) or at the onset of disease.
	Suppression of blossom blight (*Sclerotinia sclerotiorum*)	180 mL	
Bluegrasses; fescues; rye-grasses (for seed production	Control of leaf rust (*Puccinia recondita*), stem rust (*P. graminis*); suppression of powdery mildew (*Erysiphe graminis*)	90 to 120 mL	Apply prior to disease development when conditions are favourable for disease development. Use the high rate when disease pressure is high.

DO NOT make sequential applications of *Priaxor*. If disease persists or weather conditions are favourable for disease development make a second application 10 to 14 days later, with a fungicide that contains a different mode of action. Use the shorter interval when disease pressure is high.

Application Information:

Water Volume:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient fluxapyroxad is a carboximide (SDHI) fungicide with system activity. The active ingredient pyraclostrobin is a strobilurin fungicide with broad spectrum contact and systemic activity. To be used as a preventative application when environmental conditions are favourable for disease development. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Herbicides: In all canola systems, *Priaxor* can be tank mixed with *Poast Ultra* and *Equinox*. In Clearfield canola and Clearfield canola quality *Brassica juncea*, *Priaxor* can be tank mixed with *Odyssey*, *Odyssey* plus *Equinox*. BASF Canada also supports the tank mix of *Priaxor* with *Odyssey DLX*, *Odyssey Ultra*, *Tensile*, and *Ares* in Clearfield canola. In Liberty Link canola, *Priaxor* can be tank mixed with *Liberty*. In Roundup Ready canola, *Priaxor* can be tank mixed with glyphosate herbicides.

Insecticides: None registered.

Fertilizers: None registered.

Fungicides: In canola and mustard, *Priaxor* can be tank mixed with *Lance WDG Fungicide* at 140 g per acre at 20 to 50% bloom to control sclerotinia stem rot and suppress alternaria black spot.

Restrictions:

Resistance management: Refer to page 344.

Maximum Number of Applications: DO NOT exceed 1 sequential application of this product per season. Alfalfa, forage grasses – DO NOT exceed 1 application of this product per season. Barley, oat, rye, wheat, triticale, corn, soybean, canola, mustard, sunflower, flax, soybean, field pea, lentil, chickpea, faba bean, dry bean – DO NOT exceed 2 applications of this product per season.

Grazing: DO NOT feed grass hay or forage to livestock. All other crops on this label can be grazed or fed to livestock.

Preharvest interval: Barley, rye, wheat, oat – apply no later than the end of flowering; field pea, lentil, chickpea, faba bean, dry bean – 30 days; corn, soybean, canola, sunflower, flax – 21 days; forage grasses – 14 days; sweet corn – 7 days; alfalfa -not applicable

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: Crops listed on label, tuberous and corm vegetables, fruiting vegetables, pome fruits and stone fruits may be planted immediately following last application. DO NOT plant any other crops within one year of application of *Priaxor*.

Storage: Store this product away from food or feed.

Environment: Maintain specified buffer zones. Toxic to aquatic organisms, small mammals, and non-target terrestrial plants.

Hazard Rating:

☠ Danger Poison – Skin irritant.

For an explanation of the symbols used here see page 11.

Proline 480 SC

Fungicide Group – 3
(Refer to page 346)

Company:

Bayer CropScience - PCP#28359

Formulations:

480 g per L prothioconazole formulated as a suspension concentrate. Container size - 5.1 litre.

Crops, Diseases, Rates, and Timing:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Wheat	Control of septoria leaf blotch (*Septoria tritici*), tan spot (*Pyrenophora tritici-repentis*), leaf rust (*Puccinia recondita*)	125 mL[1]	Apply as a preventative foliar spray when the earliest disease symptoms appear on leaves and stems. A second application may be made after 7 days.
	Control of glume blotch (*Stagonospora nodorum*)	170 mL[1]	Apply within the time period when at least 75% of heads on the main stem are fully emerged to when 50% of heads on the main stem are in flower. For FHB, use higher rate when disease pressure is expected to be high or to provide the highest level of mycotoxin reduction.
	Suppression of fusarium head blight (FHB) (*Fusarium* spp.)	125 to 170 mL[1]	
Pearl millet, proso millet, rye, triticale	Suppression of fusarium head blight (*Fusarium* spp.)	125 to 170 mL[1]	Apply as a preventative spray.
Barley	Control of net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*), spot blotch (*Cochliobolus sativus*)	125 mL[1]	Apply as a preventative foliar spray when the earliest disease symptoms appear on leaves and stems. A second application may be made after 7 days.
	Suppression of fusarium head blight (FHB) (*Fusarium* spp.)	125 to 170 mL[1]	Apply within the time period when 70 to 100% of barley heads on the main stem are fully emerged to 3 days after full head emergence. Use higher rate when disease pressure is expected to be high or to provide the highest level of mycotoxin reduction.
Oat	Control of crown rust (*Puccinia coronota*)	125 mL[1]	Apply as a preventative foliar spray when the earliest disease symptoms appear on leaves and stems. A second application may be made after 7 days.
Corn	Suppression of *Fusarium* and *Gibberella* ear rots (*Fusarium* spp. and *Gibberella* spp.); control of rusts (*Puccinia sorghi*, *Puccinia polysora*), northern leaf blight (*Setosphaeria turcica*)	170 mL[1]	Apply from silking (tip of stigmata visible) to silk browning (stigmata drying).
Canola, rapeseed, oriental mustard	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	125 to 150 mL[2]	Apply at 20 to 50% bloom stage (prior to petal fall). Use high rate if history of heavy disease or if dense crop stand.

Continued

Crops, Diseases, Rates, and Timing *continued*:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Chickpea	Control of ascochyta blight (*Ascochyta rabiei*)	125 to 170 mL[2]	Apply at first sign of disease. Repeat applications every 10 to 14 days. Use high rate when conditions favour disease or when growing susceptible varieties.
Lentil	Control of ascochyta blight (*Ascochyta lentis*)	125 to 170 mL[2]	Apply at the first sign of disease. Repeat application 10 to 14 days later. Use high rate when conditions favour disease or when growing susceptible varieties.
Flax (linseed), borage	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	125 to 150 mL[2]	Apply at 20 to 50% bloom. Best protection will be achieved when the fungicide is applied prior to petals beginning to fall, allowing the maximum number of petals to be protected. Use high rate in fields with a history of heavy disease pressure or for dense crop stands.
Sunflower, safflower	Suppression of sclerotinia head rot (*Sclerotinia sclerotiorum*)	170 mL[1]	Apply when crop is in 10 to 50% disk flower bloom stage.

[1] Apply with non-ionic surfactant, i.e. *AgSurf* or *Agral 90* at 0.125% v/v.

[2] May be applied with the lowest rate of non-ionic surfactant, i.e. *AgSurf* or *Agral 90*.

Application Information:

DO NOT apply during periods of dead calm or when winds are gusty. Ensure uniform coverage.

Water volumes:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 20 L per acre. Follow detailed label recommendations for aerial application.

How it Works:

The active ingredient prothioconazole is a triazole fungicide with broad-spectrum systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Bayer CropScience supports the following mixes that are not on the *Proline 480 SC* label. Apply mixes according to the most restrictive use limitations for either product:

Insecticides: *Decis, Lorsban, Matador, Sevin XLR*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Corn, flax, borage, sunflower, safflower – DO NOT exceed 1 application of this product per season. Wheat, barley, oat, canola, lentil – DO NOT exceed 2 applications of this product per season. Chickpea – DO NOT exceed 3 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 30 days (barley, wheat, oat), rye, triticale, millet; 36 days (canola, flax, borage); 7 days (chickpea, lentil); 14 days (corn); 45 days (sunflower, safflower).

Re-entry: DO NOT re-enter treated fields within 24 hours of application.

Re-cropping: May be re-planted with any crop specified on the label as soon as practical. For crops not listed, wait 30 days.

Storage: DO NOT store at temperatures below freezing. Keep in original tightly closed container and store away from feeds, seeds, fertilizer, plants and food stuffs. Keep away from sources of heat. Shake well before using if stored for more than 1 year.

Environment: Toxic to aquatic organisms. DO NOT apply directly to freshwater, estuaries or marine habitats. DO NOT contaminate bodies of water by cleaning of equipment or disposal of wastes. Observe the specified buffer zones.

Hazard Rating:

☠ Caution – Poison.

For an explanation of the symbols used here see page 11.

Propiconazole

Fungicide Group – 3
(Refer to page 346)

Tilt 250E/Bumper 418 EC/Pivot 418 EC/Propel/Nufarm Propiconazole Fungicide

Company:

Syngenta Canada (*Tilt 250E* – PCP#19346, *Propel* - PCP#29548)

ADAMA Canada (*Bumper 418 EC* – PCP#28017)

Interprovincial Cooperative Ltd. (*Pivot 418 EC* – PCP#28219)

Nufarm Agriculture Inc (*Nufarm Propiconazole Fungicide* – PCP#30367)

Formulations:

Tilt 250E - 250 g per L propiconazole formulated as an emulsifiable concentrate. Container sizes - 2 x 8L and 4 x 5 L.

Bumper 418 EC - 418 g per L propiconazole formulated as an emulsifiable concentrate. Container size - 4.8 L.

Pivot 418 EC - 418 g per L propiconazole formulated as an emulsifiable concentrate. Container size - 2 x 4.8L.

Propel - 250 g per L propiconazole formulated as an emulsifiable concentrate. Container size - 8L.

Nufarm Propiconazole Funigicide - 418 g per L propiconazole formulated as an emulsifiable concentrate. Container size - 4.8L.

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rates (per acre):		Application Timing:
		250 g/L products	*418 g/L products*	
Wheat	Suppresion of septoria leaf blotch (*Septoria tritici*), tan spot (*Pyrenophora tritici-repentis*)	100 to 200 mL	60 to 120 mL	Apply with herbicide application at growth stage 12 to 23. If there is a history of high disease pressure in the field and / or field conditions favour disease development use the higher rate.
	Control of septoria leaf blotch (*Septoria tritici*), tan spot (*Pyrenophora tritci-repentis*), septoria glume blotch (*S. tritici*), stripe rust (*Puccinia striiformis*), leaf rust (*P. triticina*), stem rust (*P. graminis*), powdery mildew (*Erysiphe graminis* f.sp. *tritici*)	200 mL	120 mL	Apply at early stages of disease development (tillering or stem elongation). A second application is recommended if disease pressure continues which can be made up to half-emergence of the head.

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases:	Application Rates (per acre): *250 g/L products*	Application Rates (per acre): *418 g/L products*	Application Timing:
Barley	Suppression of net blotch (*Pyrenophora teres*)	100 to 200 mL	60 to 120 mL	Apply with herbicide application at growth stage 12 to 23. If there is a history of high disease pressure in the field and / or field conditions favour disease development use the higher rate.
	Control of spot blotch (*Cochliobolus sativus*), net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*), leaf rust (*Puccinia hordei*), stem rust (*P. graminis*), septoria leaf blotch (*Septoria* spp.), powdery mildew (*Blumeria graminis*)	200 mL	120 mL	Apply at early stages of disease development (tillering or stem elongation). A second application is recommended if disease pressure continues which can be made up to half-emergence of the head.
Oats	Control of septoria leaf blotch (*Septoria avenae*), crown rust (*Puccinia coronata*)	200 mL	120 mL	
Corn	Control of rust (*Puccinia sorghi*)	200 mL	120 mL	Apply when rust pustules first appear, make 2nd application 14 days later.
	Control of northern leaf blight (*Setosphaeria turcicum*)	100 to 200 mL	60 to 120 mL	Apply when disease first appears. Use higher rate if disease pressure is high.
Canola	Control of blackleg (*Leptosphaeria maculans*)	200 mL	120 mL	Apply during the rosette stage.
Dry bean	Control of rust (*Uromyces* spp.)	200 mL	120 mL	Apply at the first sign of disease, make 2nd application 14 to 21 days later.
	Control of powdery mildew (*Erysiphe* spp.)		--	Apply at the first sign of disease, make 2nd application 14 days later if disease continues.
Lentil, field pea, chick-pea, faba bean	Control of powdery mildew (*Microsphaera diffusa*, *Erysiphe pisi*, *E. polygoni*)	200 mL	--	Apply at the first sign of disease, make 2nd application 14 days later if disease continues.
Soybean	Control of powdery mildew (*Microsphaera diffusa*), cercospora leaf spot (*Cercospora kikuchii*)	200 mL	--	
Canaryseed*	Suppression of septoria leaf mottle (*Septoria triseti*)	200 mL	120 mL	Apply at flag leaf emergence.
Timothy*†	Control of purple eyespot (*Cladosporium phlei*)	200 mL	120 mL	Apply at the first sign of disease (usually at the beginning of flowering). Can be applied up to full flowering, spray interval of 14 days.

* Ground application only.

† Only *TILT 250E*, *Pivot 480 EC* and *Propel* are registered for use on this crop.

Application Information:

Water Volume:

Ground: Minimum 80 L per acre

Aerial: 16 to 20 L per acre

How it Works:

The active ingredient propiconazole is a triazole fungicide with broad spectrum systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Herbicides: In wheat and barley only, propiconazole may be tank-mixed with one of the following: *2,4-D amine, Estemine 2,4-D, MCPA amine, Estemine MCPA, Buctril-M* or *Pardner* and in wheat only, may be applied with *Horizon 240EC*. In wheat and barley only, *Pivot 418 EC* may be tank-mixed with *Logic M* or *Brotex 240; Pivot 418 EC,Bumper 418 EC*, or *Nufarm Propiconazole Fungicide* may be tank-mixed with *Badge* or *Bromotril 240 EC*. In spring wheat and barley only, *Tilt 250E* or *Propel* may be tank-mixed with *Axial 100EC*. Refer to labels for tank-mix precautions.

Fertilizers: Propiconazole may be applied with up to 4 kg per acre (9 lb per acre) of actual nitrogen. The appropriate amount of urea can be dissolved in water and added to the spray tank before adding the fungicide. Excessive nitrogen or application during hot weather may result in crop injury. DO NOT add nitrogen when tank-mixing propiconazole with a herbicide.

Insecticides: In field corn, propiconazole can be tank-mixed with one of the following: *Matador 120EC/Silencer 120EC* or *Ripcord*. In legumes, *Tilt 250E* or *Propel* can be tank-mixed with *Matador 120EC*.

Note: Syngenta supports the following mixes that are not on the respective labels. Apply mixes according to the most restrictive use limitations for either product:

Propel Tank Mixes:

Herbicides: *Axial, Broadband, Horizon NG, Touchdown Total, Traxion*

Tilt Tank Mixes:

Herbicides: *Liberty, Sierra 2.0, Touchdown Total, Traxion*, a ½ rate of *Tilt* may also be tank mixed with *Broadband*.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Wheat, barley, corn, bean, legume, timothy – DO NOT exceed 2 applications of this product per season.

Grazing: DO NOT graze animals on treated green crops within 3 days of application. DO NOT feed straw treated with herbicide tank mixes to livestock. DO NOT use treated soybean seed for animal feed.

Preharvest interval: Wheat, oats, barley - 45 days. Canola - 60 days. Corn - 14 days if tank-mixed with an insecticide. Soybeans - 50 days. Beans - 28 days. Timothy - 14 days.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: DO NOT freeze. Store products away from food or feed.

Environment: Toxic to aquatic organisms. DO NOT contaminate any body of water by direct application, drift or by cleaning equipment.

Hazard Rating:

Warning – Poison (*Bumper 418 EC, Pivot 418 EC, Nufarm Propiconazole Fungicide*).

Caution – Poison (*Tilt 250 EC, Propel*).

Warning – Eye and Skin Irritant.
Potential Skin Sensitizer.

For an explanation of the symbols used here see page 11.

Propulse

Fungicide Group – 3, 7
(Refer to page 346)

Company:

Bayer CropScience – PCP#30511

Formulation:

200 g per L prothioconazole + 200 g per L fluopyram formulated as a suspension concentrate.

Container size – 6.1 litres.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre)*:	Application Timing:
Dry bean	Ascochyta blight (*Ascochyta* spp.), anthracnose (*Colletotrichum lindemuthianum*)	200 to 300 mL	Apply preventatively when disease pressure is high or when agronomic or weather conditions are conducive to disease development. Continue applications as needed, on a 10 to 14 day interval. Use the higher rate when conditions for heavy infestation exist.
	White mould (*Sclerotinia sclerotiorum*)	300 mL	Begin fungicide applications preventatively. When disease pressure is high or when agronomic or weather conditions are conducive to disease development, continue applications as needed on a 7 to 14 day interval. Use shorter intervals for best protection.
Faba bean	Ascochyta blight (*Ascochyta* spp.)	200 to 300 mL	Apply preventatively when disease pressure is high or when agronomic or weather conditions are conducive to disease development. Continue applications as needed, on a 10 to 14 day interval. Use the higher rate when conditions for heavy infestation exist.
	White mould (*Sclerotinia sclerotiorum*)	300 mL	Begin fungicide applications preventatively. When disease pressure is high or when agronomic or weather conditions are conducive to disease development, continue applications as needed on a 7 to 14 day interval. Use shorter intervals for best protection.

Application Information:

Water Volume:
Ground: Minimum of 40 L per acre.

Use sufficient water and spray pressure to provide thorough and uniform coverage of plants. DO NOT apply under periods of dead calm. Avoid application of this product when winds are gusty.

How it Works:

The active ingredient prothioconazole is a triazole fungicide with broad-spectrum systemic activity. The active ingredient fluopyram is a carboxamide fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344. Make no more than 2 sequential applications before switching to a fungicide with a different mode of action.

Maximum number of applications: DO NOT apply more than 605 mL per acre per season.

Grazing: DO NOT graze treated area, and do not harvest for forage or hay.

Preharvest interval: DO NOT apply within 14 days of harvest.

Re-entry: DO NOT re-enter treated areas until 24 hours after application.

Re-cropping: Dry beans, chickpeas, lentils and peanuts may be replanted immediately following the last application. Following dry beans, the following crops may be planted 30 days after the last application: Alfalfa, canola, cereal grains, corn, potato and soybean. Do not rotate to any other crops.

Aerial Application: DO NOT apply by air.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Do not store below freezing. If stored for one year or longer, shake well before using.

Environment: This product is toxic to birds and aquatic organisms. When using *Propulse* consult the product label for buffer zones.

Hazard Rating:

None listed.

Prosaro 250 EC

Fungicide Group – 3
(Refer to page 346)

Company:

Bayer CropScience - PCP#29821

Formulation:

125 g per L prothioconazole + 125 g per L tebuconazole, formulated as an emulsifiable concentrate.

Container size – 6.5 litres; 104 L tote.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Wheat*	Control of septoria leaf blotch (*Septoria tritici*), glume blotch (*S. tritici, Stagnospora nodorum*), tan spot (*Pyrenophora tritici-repentis*), leaf rust (*Puccinia recondita*), stem rust (*P. graminis*), stripe rust (*P. striiformis*), powdery mildew (*Erysiphe graminis*)	325 mL	FHB: apply within the time period from when at least 75% of the heads on the main stem are fully emerged to when 50% of heads on the main stem are in flower.
	Suppression of fusarium head blight (FHB) (*Fusarium* spp.)		
Barley*	Control of net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*), spot blotch (*Cochliobolus sativus*), septoria leaf blotch (*Septoria passerinii*), leaf rust (*Puccinia hordei*), stem rust (*P. graminis*), stripe rust (*P. striiformis*), powdery mildew (*Erysiphe graminis*)	325 mL	FHB: apply within the time period when 70 to 100% of barley heads on the main stem are fully emerged to 3 days after full head emergence.
	Suppression of fusarium head blight (FHB) (*Fusarium* spp.)		

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Oats	Control of crown rust (*Puccinia coronata*), stem rust (*Puccinia graminis*), stagonospora leaf blotch (*Stagonospora nodorum*), black stem (*Stagonospora avenae* syn. *Septoria avenae*)	325 mL	Apply as a preventative foliar spray when the earliest disease symptoms appear on leaves and stems.

**Prosaro 250 EC* may be applied sequentially after an application of *Folicur 432F* or *Folicur 250EW*. The minimum interval between applications is 7 days.

Application Information:

DO NOT apply during periods of dead calm or when winds are gusty. Ensure uniform coverage.

Water Volume:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 20 L per acre. Follow detailed label recommendations for aerial application.

How it Works:

The active ingredients prothioconazole and tebuconazole are demethylation inhibitors with broad-spectrum systemic activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes

None registered.

Bayer CropScience supports the following mixes that are not on the *Prosaro 250 EC* label. Apply mixes according to the most restrictive use limitations for either product:

Insecticides: *Lorsban*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 1 application of this product per season.

Grazing: DO NOT allow livestock to graze or feed green forage to livestock prior to 6 days after treatment with *Prosaro 250 EC* fungicide. Straw cut after harvest may be fed or used for bedding.

Preharvest interval: 36 days.

Re-entry: DO NOT re-enter treated fields until 12 hours post- application.

Re-cropping: Treated areas may be replanted with any crop specified on the label as soon as practical after application. For oat and soybean, DO NOT plant back within 30 days of application. For all other crops, DO NOT plant back until 120 days after application. Tebuconazole is persistent and will carryover. It is recommended that any products containing tebuconazole not be used in areas treated with this product during the previous season.

Storage: DO NOT store in or around the home. DO NOT store at temperatures below freezing. Keep in original tightly closed container and store away from feeds, seeds, fertilizer, plants and food stuffs. Keep away from sources of heat. Shake well before using if stored for more than 1 year. DO NOT contaminate water, food, or feed by storage or disposal.

Environmental: Toxic to birds, small wild animals, aquatic organisms, and non-target plants. As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests. DO NOT apply to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Runoff is hazardous to aquatic organisms in neighbouring areas. To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body. Follow buffer zones as per the product label.

Hazard Rating:

☠ Danger Eye irritant.

▽ Caution – Skin irritant

For an explanation of the symbols used here see page 11.

Quadris

Fungicide Group – 11
(Refer to page 346)

Company:

Syngenta Canada – (*Quadris* – PCP#26153)

Formulation:

250 g per L azoxystrobin formulated as a flowable suspension concentrate.

Container size – *Quadris* 4 x 3.78 L jugs.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rates (per acre):	Application Timing:
Dry bean	Anthracnose (*Colletotrichum lindemuthianum*), ascochyta blight (*Ascochyta* spp.)	200 mL	Apply before disease is established and no later than onset of flowering; make 2nd application 10 to 14 days later.
Chickpea, faba bean	Ascochyta blight (*Ascochyta* spp.), anthracnose (*Colletotrichum* spp.),	200 mL	Apply before disease is established and no later than onset of flowering; make 2nd application 10 to 14 days later.
Lentil	Anthracnose (*Collectotrichum truncatum*), ascochyta blight (*Ascochyta lentis*)	200 mL	Apply before disease is established and no later than onset of flowering; make 2nd application 10 to 14 days later.
Field pea	Mycosphaerella blight (*Mycosphaerella pinodes*), powdery mildew (*Erysiphe pisi*), anthracnose (*Colletotrichum* spp.), ascochyta blight (*Ascochyta* spp.)	200 mL	Apply before disease is established and no later than onset of flowering; make 2nd application 10 to 14 days later.
Soybean	Powdery mildew (*Microsphaera diffusa*), cercospora leaf spot (*Cercospora kikuchii*)	200 mL	Apply at the R1 to R3 stage, or when 5% disease in the field; make 2nd application 14 days later.
Canola	Blackleg (*Leptosphaeria maculans*)	200 mL	Apply at the 2 to 6 leaf stage.
	Sclerotinia stem rot (*Sclerotinia sclerotiorum*)	280 to 400 mL	Apply at early bloom (prior to 30% bloom). This timing will also suppress alternaria black spot. Use the higher rate if there is a history of sclerotinia infection in the area and when conditions favour development.
	Alternaria black spot (*Alternaria brassicae, A. raphani*)	200 mL	Apply at pod stage (90% petal fall).
Corn	Rust (*Puccinia sorghi*)	180 mL	Apply before disease is established and make 2nd application 7 to 14 days later.
Coriander* (for seed production)	Blossom blight (*Aureobasidium* spp.)	180 to 450 mL	Apply once prior to disease establishment. Use high rate if high disease pressure.

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases Controlled:	Application Rates (per acre):	Application Timing:
Potato	Early blight (*Alternaria solani*)	200 to 320 mL	Apply prior to disease development and repeat on a 7 to 14 day interval. Use the higher rate if extending treatment interval to 14 days. Apply in alternation with fungicides with a different mode of action. If late blight becomes established, discontinue use of *Quadris* and use alternative fungicides.
	Late blight (*Phytophthora infestans*)	320 mL	
	Rhizoctonia stem rot, stolon canker, black scurf (*Rhizoctonia solani*), silver scurf (*Helminthosporium solani*)	4 to 6 mL per 100 m of row	Apply once as an in-furrow spray in 20 to 56 L per acre water at planting. Mount the spray nozzle so that spray is directed into the furrow as a 15 to 20 cm band just before the seed is covered. DO NOT apply by air.
	Black dot (*Colletotrichum coccodes*)	200 to 320 mL	Apply on a 7 to 14 day interval prior to disease development. Use the high rate and short application interval under high disease pressures.

* DO NOT apply by air.

Application Information:

Water Volume:

Ground: Use sufficient water volume to obtain adequate coverage. Use minimum 40 L per acre. In-furrow treatment in 20 to 56 L per acre.

Aerial: Use minimum of 18 L per acre. Ensure uniform application.

How it Works:

The active ingredient azoxystrobin is a methoxyacrylate compound (strobilurin) with broad spectrum contact and systemic activity. To be used as a preventative and curative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes

Insecticides: For cereals, legumes and field corn, *Quadris* may be tank-mixed with *Matador 120EC* insecticide. For control of potato diseases and insects, *Quadris* can be tank-mixed with *Actara 240* insecticide. Consult each label for pests controlled, appropriate timing, precautions, and specific application instructions.

For the control of early blight of potato, *Quadris* may be tank-mixed with *Bravo 500*. For control of Rhizoctonia stem, stolon canker and black scurf in potato, *Quadris* can be tank-mixed with *Ridomil Gold 480EC*. For control of ascochyta blight in chickpea, *Quadris* must be tank-mixed with *Bravo 500* (minor use registration). *Quadris* may be tank-mixed with *Tilt 250E* in wheat and barley.

Note: Syngenta supports the following mixes that are not on the *Quadris* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Touchdown Total, Traxion*

Fungicides: *Allegro 500F*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Coriander – DO NOT exceed 1 application of this product per season. Bean, canola, chickpea, corn, lentil, pea, soybean – DO NOT exceed 2 applications of this product per season. Potato – DO NOT exceed 3 applications of this product per season.

Grazing: DO NOT feed dried pea vines to livestock.

Preharvest interval: Canola - 30 days. Coriander - 21 days. Corn - 7 days. Legumes - 15 days. Potatoes - 1 day.

Re-entry: DO NOT re-enter treated areas until residues have dried.

Re-cropping: DO NOT plant broadleaf or root crops within 30 days of application. DO NOT plant cereals within 45 days of application.

Storage: Store in a cool, dry, well-ventilated area. DO NOT store below 0°C.

Environment: This product is toxic to fish and aquatic organisms. Observe buffer zones outlined in the label.

Hazard Rating:

None.

Other precautions: May irritate eyes.

Quadris Top

Fungicide Group – 3, 11
(Refer to page 346)

Company:

Syngenta Canada – PCP#30518

Formulation:

200 g per L azoxystrobin and 125 g per L difenconazole formulated as a flowable suspension concentrate.

Container size – 2 x 10.125 L.

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre)*:	Application Timing:
Potato	Control of early blight (*Alternaria solani*)	229 to 405 mL	Apply on a 7 to 14 day interval, starting prior to disease establishment.
	Suppression of brown spot (*Alternaria alternata*), black dot (*Colletotrichum coccodes*)	229 to 405 mL	Apply prior to disease. Apply no more than 1 application to target these diseases. If disease pressure is high, use the highest rate.
	Suppression of sclerotinia white mould	405 mL	Apply at full bloom. Repeat applications at intervals of 7 to 10 days.

Application Information:

Water Volume:

Ground: Use sufficient water volume to obtain adequate coverage. Use minimum 60 L per acre.

Aerial: Use sufficient water volume to obtain adequate coverage. Use minimum 60 L per acre.

How it Works:

The active ingredient azoxystrobin belongs to a strobilurin group of fungicides and difenconazole is a triazole fungicide. Together they provide broad spectrum preventative and systematic. To be used as a preventative and curative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed three applications per season.

Grazing: No restrictions listed.

Preharvest interval: 14 days.

Re-entry: DO NOT re-enter treated areas until 12 hours after application.

Re-cropping: Do not plant any other crop for a period of 60 days following application to the preceding crop unless *Quadris Top* or *Inspire* are registered for that crop.

Storage: Store in cool, dry place. Do not store food, beverages or tobacco products in storage area.

Environment: This product is toxic to aquatic organisms (or invertebrates), fish and mammals. Observe buffer zones outlined in the label.

Hazard Rating:

▽ Caution – Eye irritant.

For an explanation of the symbols used here see page 11.

Quash

Fungicide Group – 3
(Refer to page 346)

Company:

Valent Canada distributed by Nufarm Agriculture – PCP#30402

Formulation:

50.0% metconazole formulated as water dispersible granules. Container sizes – 8 x (2 x 280g) = 4.48kg/case

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre):	Application Timing:
Canola	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	57 to 115 g	Make a single, preventative application between 20% and 50% bloom.
Dry bean	Suppression of white mould (*Sclerotinia sclerotiorum*)	115 g	Apply prior to disease development. Make first application at 20 to 50% bloom stage, before disease symptoms are visible. Make second application at full bloom. Do not make the second application until 9 days have passed since the first application.
Field pea	Control of powdery mildew (*Erysiphe pisi*), suppression of white mould (*Sclerotinia sclerotiorum*)		
Chickpea	Suppression of ascochyta blight (*Ascochyta rabiei*), white mould (*Sclerotinia sclerotiorum*)		
Lentil	Suppression of ascochyta blight (*Ascochyta lentis*), white mould (*Sclerotinia sclerotiorum*)		
Potato	Control of early blight (*Alternaria solani*)	70 to 115 g	Apply prior to infection for preventative control. If conditions are favourable for disease development, make additional applications at 7 to 10 day intervals.
	Suppression of white mold (*Sclerotinia sclerotiorum*)	115g	Make first application prior to infection, generally at row closure and/or first bloom. Make second application 14 days later, if conditions favor white mold development.
Sunflower*	Control of rust (*Puccinia helianthi*) and suppression of sclerotinia head rot (*Sclerotinia sclerotiorum*)	115g	**Sclerotinia:** First preventative application at early to mid bloom or 7 to 14 days later. **Rust:** Apply when conditions favour disease development prior to infection.

Application Information:

*NOTE: Since these uses are registered under the User Requested Minor Use Label Expansion (URMULE) program, the manufacturer assumes no responsibility for fungicide performance. Those who apply these uses do so at their own risk.

DO NOT apply during periods of dead calm or when winds are gusty. Ensure uniform coverage.

Water Volume:
Ground: Minimum of 80 L per acre.
Aerial: Minimum of 20 L per acre.

Consult nozzle manufacturers for specific nozzle and pressure recommendations. Ensure thorough coverage for optimal disease control/suppression.

How it Works:

The active ingredient metconazole is a broad spectrum triazole demethylation inhibitor (DMI) fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Canola – DO NOT exceed more than 115g/ac of this product per season. Dry bean, field pea, chickpea, lentil – DO NOT exceed 2 applications of this product per season. Sunflower - DO NOT exceed 2 applications of this product per season. Potato – DO NOT exceed 3 applications of this product per season at the high rate, DO NOT exceed 4 applications of this product per season at the low rate.

Grazing: No restrictions listed.

Preharvest interval: Potato – 1 day; Dry bean, field pea, chickpea, lentil – 21 days; Canola – 45 days; Sunflower - 21 days.

Re-entry: Potato – DO NOT re-enter treated areas within 12 hours of application. Canola – DO NOT re-enter treated areas within 12 hours of application. Dry bean, field pea, chickpea, lentil – DO NOT re-enter treated areas within 1 day of application. Sunflower - DO NOT re-enter treated area within 6 days of application. Re-entry intervals maybe longer for more intensive activities in potatoes and legume crops, see label for complete list of re-entry periods.

Re-cropping: A plant back interval of 30 days is required for all crops not listed on the *Quash* label.

Storage: Store in original tightly closed container. Protect from freezing. Store in cool, dry place. Store this product away from food or feed.

Environment: Avoid run-off from treated areas into aquatic areas. Toxic to aquatic organisms, non-target terrestrial plants and small wild animals.

Hazard Rating:

☠ Caution – Poison

Check label for first-aid information.

For an explanation of the symbols used here see page 11.

Quilt

Fungicide Group – 3, 11

(Refer to page 346)

Company:

Syngenta Canada – PCP#28328

Formulations:

75 g per L azoxystrobin and 125 g per L propiconazole formulated as a suspension concentrate.

Container size – 2 x 10.125 L case and 101.25 tote.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Dry bean	Anthracnose (*Colletotrichum truncatum*)	405 to 607 mL	Make first application before disease is established and no later than the onset of flowering. A second application 14 days later may be needed if conditions persist. Apply the high rate under conditions of high disease pressure.
	Powdery mildew (*Microsphaera diffusa, Erysiphe* spp.)	405 mL	Make first application at the first sign of disease. A second application 14 days later may be needed if conditions persist.

Continued

Crops, Disease, Rates and Timing *continued*:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Lentil Soybean	Anthracnose (*Colletotrichum truncatum*)	405 to 607 mL	Make first application before disease is established and no later than the onset of flowering. A second application 14 days later may be needed if conditions persist. Apply the high rate under conditions of high disease pressure.
	Powdery mildew (*Erysiphe* spp.)	405 mL	Make first application at the first sign of disease. A second application 14 days later may be needed if conditions persist.
Chickpea Faba bean	Powdery mildew (*Erysiphe* spp.)	405 mL	Make first application at the first sign of disease. A second application 14 days later may be needed if conditions persist. Apply the high rate under conditions of high disease pressure.
Field pea	Mycosphaerella blight (*Mycosphaerella pinodes*)	405 to 607 mL	
	Powdery mildew (*Erysiphe pisi, Microsphaera diffusa*)	405 mL	
Canola	Blackleg (*Leptosphaeria maculans*)	405 mL	Apply during the rosette stage between 2nd true leaf and bolting.
Barley	Net blotch (*Pyrenophora teres*)	202* to 405 mL	At first sign of disease starting at the two leaf stage. Use the higher rate if there is a history of high disease pressures in the field and / or field conditions favour disease.
	Net blotch (*Pyrenophora teres*), septoria leaf blotch (*Septoria* sp.), scald (*Rhynchosporium secalis*), tan spot (*Pyrenophora tritici-repentis*)	304 mL	Apply between stem elongation and half-head emergence. For stripe rust, use the higher rate if there is a history of high disease pressures in the field and / or field conditions favour disease development.
	Stripe rust (*Puccinia striiformis*)	304 to 405 mL	
	Leaf rust (*Puccinia hordei*)	405 mL	
Wheat	Tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria* sp.)	202* to 405 mL	At first sign of disease starting at the two leaf stage. Use the higher rate if there is a history of high disease pressures in the field and / or field conditions favour disease.
	Septoria leaf blotch (*Septoria* sp.), tan spot (*Pyrenophora tritici-repentis*)	304 mL	Apply between stem elongation and half-head emergence. For stripe rust and leaf rust in wheat, use the higher rate if there is a history of high disease pressures in the field and / or field conditions favour disease development.
	Stripe rust (*Puccinia striiformis*), leaf rust (*Puccinia triticina*)	304 to 405 mL	
Rye	Scald (*Rhynchosporium secalis*), septoria leaf blotch (*Septoria* sp.), tan spot (*Pyrenophora tritici-repentis*)	304 mL	
Triticale	Septoria leaf blotch (*Septoria* sp.), tan spot (*Pyrenophora tritici-repentis*)	304 mL	

Continued

Crops, Disease, Rates and Timing *continued*:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Oat	Septoria leaf blotch (*Septoria* spp.), net blotch (*Pyrenophora teres*)	304 mL	Apply between stem elongation and half-head emergence.
	Crown rust (*Puccinia coronata*)	304 to 405 mL	For crown rust, use the higher rate if there is a history of high disease pressures in the field and/or field conditions favour disease development.
Field, sweet, and popping corn (including seed production)	Rust (*Puccinia sorghi*), northern leaf blight (*Setosphaeria turcicum*)	304 to 405 mL	Make first application at the first sign of disease, followed by a second application 14 days after the first, if environmental conditions are favourable for disease development.

*Suppression only at rates less than 304 mL per acre

Application Information:

Water Volume:

Ground: Apply in a minimum of 18 L of water per acre for legume vegetables and soybean. Apply in a minimum of 40 L of water per acre for other crops.

Aerial: Apply in a minimum of 18 L of water per acre.

How it Works:

The active ingredient azoxystrobin is a methoxyacrylate compound (strobilurin) with broad spectrum contact and systemic activity. The active ingredient propiconazole is a triazole fungicide with broad-spectrum systemic activity. To be used as a preventative and curative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Insecticides: *Quilt* can be tank-mixed with insecticide *Matador 120EC* for foliar disease and insect control in cereals. Consult each label for pests controlled, precautions, and specific application instructions

Note: Syngenta supports the following mixes that are not on the *Quilt* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides: *Axial, Broadband* + registered tank mixes, *Horizon NG, Sierra, Touchdown Total, Traxion*

Fungicides: *Quadris*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Canola – DO NOT exceed 1 application of this product per season. Soybean, dry bean, faba bean, chickpea, field pea, lentil, barley, wheat, rye, triticale, oat, corn – DO NOT exceed 2 applications of this product per season.

Preharvest interval: 30 days (soybeans and dry legume vegetables, canola); 15 days (succulent podded and shelled legume vegetables); 14 days (soybean hay and dry pea hay); 45 days (wheat, barley, rye, triticale, and oat); 14 days (field corn, sweet corn, and popcorn).

Re-entry: DO NOT re-enter treated fields within 12 hours of application.

Re-cropping: Oats and rye may be planted 45 days after *Quilt* application. DO NOT plant any other crop intended for food, grazing, or any component of animal feed or bedding within 105 days of *Quilt* application to the preceding crop unless the second crop appears on the *Quilt* label.

Storage: Store in a cool, dry, well ventilated area away from feed and foodstuffs, and out of reach of children and animals. DO NOT store at temperatures below freezing. Keep in original container, tightly closed, during storage.

Environment: Azoxystrobin is persistent and will carry over. *Quilt* is toxic to aquatic organisms and is extremely phytotoxic to certain apple varieties. Avoid spraying when the wind is blowing towards a nearby sensitive crop, garden, terrestrial habitat (such as shelter-belt), or aquatic habitat. DO NOT contaminate irrigation or drinking water supplies by cleaning of equipment or disposal of wastes. Avoiding spray drift is the responsibility of the applicator.

Hazard Rating:

▽ Caution – Poison and skin irritant

For an explanation of the symbols used here see page 11.

Ranman 400SC

Fungicide Group – 21
(Refer to page 346)

Company:

ISK Biosciences Corporation; distributed by Engage Agro Corporation – PCP#30716

Formulation:

400 g per L cyazofamid formulated as a suspension concentrate.

Container size: 500 mL and 200 L

Crops, Diseases and Timing:

Control of late blight (*Phytophthora infestans*) on potato. Begin applications on a 7 day schedule when warning systems forecast disease infection periods or at row closure. Use the low rate under low disease pressure and increase the rate as disease pressure and/or crop development increases, up to the maximum rate. For late blight tuber rot control, ensure that the last 2 to 3 applications prior to desiccation are made at the maximum rate following resistance management practices.

Rates:

40 to 80 mL per acre. *Ranman 400SC* should be tank mixed with a non-ionic or organo-silicone surfactant (such as *Sylgard 309* at 60 mL per acre).

Application Information:

DO NOT apply by air. DO NOT make sequential applications. After one application alternate with at least one application of fungicide with a different mode of action.

Water Volume: Use sufficient volume to obtain coverage of the foliage, 80 to 240 L per acre.

How it Works:

The active ingredient cyazofamid is a cyanoimidazole fungicide with contact activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 6 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 7 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: A plant back interval of 30 days is required.

Storage: Store product in original container in a secured dry place separate from other pesticides, fertilizer, food and feed.

Environment: Toxic to aquatic organisms. The specified buffer zones (Field sprayer, 5 m; Field sprayer with use of shrouds, 2 m; Field sprayer with use of cones, 4 m) are required between the point of direct application and the closest downwind edge of sensitive freshwater habitats.

Hazard Rating:

None listed.

Reason 500SC

Fungicide Group – 11
(Refer to page 346)

Company:

Bayer CropScience – PCP#27462

Formulation:

500 g per L fenamidone formulated as a suspension concentrate. Container sizes - 2, 4 or 10 L.

Crops, Diseases and Timing:

Control of early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) on potato. Begin application when plants are 15 to 20 cm high or when disease threatens. Apply a fungicide with a different mode of action within 7 to 10 days after each application using the shorter interval when conditions favor disease development. Ensure even application.

Rates:

Apply at 80 mL per acre as a tank mix with either *Dithane DG** at 500 g per acre or *Bravo 500* at 500 mL per acre.

*When using other formulations of mancozeb, adjust application rates to apply 375 g active ingredient per acre.

Application Information:

Water Volume:

Aerial: Use minimum of 14 L per acre at a pressure no less than 300kPa.

How it Works:

The active ingredient fenamidone is a strobilurin fungicide with contact activity. To be used as a preventative and inhibitive (spore germination and antisporulant) fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides: To be applied ONLY as a tank-mix with mancozeb fungicides or *Bravo 500*. Follow mixing instructions provided on the label.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 6 applications or 0.48 L per acre of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 14 days.

Re-entry: DO NOT re-enter treated areas until residues have dried.

Re-cropping: A 30 day plant-back interval is required for potato and all other crops.

Storage: DO NOT allow product to freeze. If stored more than 1 year, shake well before using. Keep away from fire, open flame or other sources of heat. Store in tightly closed container away from fertilizer, seeds, feed or food

Environment: For ground application maintain an 8 m buffer zone between areas sprayed and aquatic systems. For aerial application allow a 10 m buffer. Toxic to fish and other aquatic organisms; DO NOT apply where runoff is likely to occur.

Hazard Rating:

☠ Caution Poison – Eye Irritant.

For an explanation of the symbols used here see page 11.

Regalia Maxx

Fungicide Group – Not classified, bio-fungicide

Company:

Marrone Bio Innovations – PCP#30199

Distributed by Engage Agro Corporation

Formulation:

20% extract of *Reynoutria sachalinensis* formulated as a suspension concentrate.

Container size – 4 x 5 L.

Crops, Diseases and Timing:

Partial suppression of septoria leaf blotch (*Septoria tritici*) in wheat. Apply preventatively or when disease systems first appear after initial jointing. Repeat applications in 7 to 14 day intervals depending upon crop growth and disease pressure.

Rates:

0.25% v/v in 160 to 240 L of water per acre.

Application Information:

DO NOT apply by air. When environmental conditions and plant stage are conducive to rapid disease development use *Regalia Maxx* in a rotational program with other registered fungicides.

Water Volume:

Ground: Minimum of 160 to 240 L per acre

How it Works:

Reynoutria sachalinensis is a plant extract to induce the plants' natural defense mechanisms against certain fungal and bacterial disease. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: No maximum number of applications specified.

Grazing: No restrictions listed.

Preharvest Interval: May be applied up to the day of harvest.

Re-entry: DO NOT re-enter into treated areas until the spray is dried.

Re-cropping: No restrictions listed.

Storage: Store in original tightly closed container.

Environmental Hazards: DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

None listed.

Revus

Fungicide Group – 40
(Refer to page 346)

Company:

Syngenta Canada – PCP#29074

Formulation:

250 g per L mandipropamid formulated as a suspension concentrate. Container size – 4 x 3.78 L.

Crops, Diseases and Timing

Control of late blight (*Phytophthora infestans*) on potato. Begin applications prior to disease development. Continue applications on 7 to 10 day intervals, following resistance management guidelines.

Rates:

0.16 to 0.24 L per acre. The use of a non-ionic adjuvant (0.25% v/v) is recommended.

Application Information:

Water Volume:

Ground: Use a minimum water volume of 40 L per acre. In situations where dense canopy or pest pressure is high, use greater water volumes.

Aerial: Use a minimum water volume of 18 L per acre.

Nozzles: DO NOT apply using any type of ultra low volume (ULV) spray system.

How it Works:

The active ingredient mandipropamid is a carboxylic acid amide (CAA) fungicide with contact and systemic activity. To be used as a preventative and inhibitive (prevents spore germination) fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides: *Bravo 500.*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 4 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 14 days.

Re-entry: DO NOT re-enter treated area within 12 hours of application.

Re-cropping: DO NOT plant any crop which is not registered for use with *Revus* for a period of 30 days after the last application.

Storage: Store in a cool dry place away from food, beverages, and tobacco products.

Environment: To reduce runoff into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay. Runoff into aquatic habitats may be reduced by including a vegetative strip between the treated area and the edge of the water body.

Hazard Rating:

▽ Caution – Poison.

◇ Warning – Skin Irritant.
Potential Skin Sensitizer.

For an explanation of the symbols used here see page 11.

Revus Top

Fungicide Group – 3, 40
(Refer to page 346)

***Revus Top* is a co-pack of *Revus Fungicide* (mandipropamid, page 410) and *Inspire Fungicide* (difenoconazole, page 378). Information listed is restricted to crop, diseases, rates. For other detailed information on the component products see the product pages listed above.**

Company:

Syngenta Canada

Formulation:

Revus Top has two components:

***Revus* (PCP #29074):** 250 g per L mandipropamid formulated as a suspension concentrate.
***Inspire* (PCP #30004):** 250 g per L difenoconazole as an emulsifiable concentrate.
See the component products for other information. Use the most stringent restrictions for either product.

Container size: 2x3.78 L of *Revus* + 2x3.78 L of *Inspire*.

Crops, Diseases and Timing:

Control of early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) on potato. Begin applications prior to late blight development, at early stages of early blight, or when conditions are conducive for development of either disease.

Rates:

0.16 to 0.24 L per acre of *Revus*.

0.12 to 0.21 L per acre of *Inspire*.

See pages listed above for recommendations of resistance management and the maximum number of applications per season. Follow the most stringent restrictions for either product.

Hazard Rating:

▽ Caution – Eye and skin irritant.

☠ Caution – Poison.

Check label for first aid information.

For an explanation of the symbols used here see page 11.

Ridomil Gold Products

Fungicide Group
Ridomil Gold/Bravo,
Ridomil Gold SL/Bravo - 4, M5
Ridomil Gold 480EC,
Ridomil Gold 480SL - 4
(Refer to page 346)

Company:

Syngenta Canada
(*Ridomil Gold/Bravo* – PCP# 26443;
Ridomil Gold SL/Bravo – PCP# 29239;
Ridomil Gold 480EC – PCP# 25384;
Ridomil Gold 480SL – PCP# 28474)

Formulation:

Ridomil Gold/Bravo - 500 g per L chlorothalonil and 480 g per L metalaxyl-M. Container size 8.83 L jug twin-pak.

Ridomil Gold SL/Bravo - 500 g per L chlorothalonil and 480 g per L metalaxyl-M formulated as a soluble concentrate. Container size - 8.83 L jug twin-pak.

Ridomil Gold 480EC - 480 g per L metalaxyl-M formulated as an emulsifiable concentrate. Container size - 4 x 3.78 L jugs.

Ridomil Gold 480SL - 480 g per L metalaxyl-M formulated as a solution. Container size - 10 x 0.5 L or 4 x 3.78 L jugs.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate:	Application Timing:
Potato	***Ridomil Gold/Bravo, Ridomil Gold SL/Bravo:*** Early blight (*Alternaria solani*), late blight (*Phytophthora infestans*), late blight tuber rot, botrytis vine rot (*Botrytis cinerea*); suppression of pythium leak (*Pythium* spp.) and pink rot (*Phytophthora erythroseptica*)	***Ridomil Gold/Bravo, Ridomil Gold SL/Bravo:*** One 8.83 L jug treats 10 acres. The entire contents of the jug must be added to the spray tank or an improper mixture will result.	Begin preventive applications early in the season when conditions are favorable for disease (before infection), no later than when the plant foliage meets within the row uniformly across the field. Apply a second and third application at 14 day intervals. Other registered contact fungicides should be applied 7 days after each application.
	Ridomil Gold 480EC, Ridomil Gold 480SL: Suppression of pink rot (*Phytophthora erythroseptica*) as in-furrow treatment.	***Ridomil Gold 480EC, Ridomil Gold 480SL:*** 4 mL per 100 m row, applied in-furrow at planting.	

Application Information:

Water Volume:

Ground: use sufficient water to ensure thorough coverage of foliage. Use a water volume of 90 to 640 L per acre.

In-furrow treatment: use a minimum of 12 L per acre. For tank mixes with *Quadris* water volume should be 20 to 56 L per acre.

Aerial: use a minimum water volume of 20 L per acre.

How it Works:

The active ingredient metalaxyl is an acylalanine fungicide with systemic activity. The active ingredient chlorothalonil is a chloronitrile fungicide with contact activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Ridomil Gold/Bravo, Ridomil Gold SL/Bravo - None registered.

Ridomil Gold 480EC, Ridomil Gold 480SL - May be tank mixed with *Quadris* for in-furrow treatment to control rhizoctonia stem rot, stolon canker, black scurf and suppression of pink rot.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: Ground / aerial (*Ridomil Gold/Bravo, Ridomil Gold/SL Bravo*) - DO NOT exceed 3 applications of this product per season. In-furrow (*Ridomil Gold 480EC, Ridomil Gold 480SL*) – DO NOT exceed 1 application of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 90 days for in-furrow application.

Re-entry: *Ridomil Gold 480EC, Ridomil Gold 480SL* – DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: A plant back interval of 30 days for root crops is required after the in-furrow application.

Storage: Protect from excessive heat.

Environment: DO NOT apply where runoff is likely to occur. DO NOT use on coarse textured gravelly soils, soils with less than 2% organic matter or in areas where the water table may be high. Avoid application by ground or air near or around bodies of water. DO NOT contaminate streams or ponds by spray drift, by cleaning equipment, or disposal of wastes. A buffer zone of 100 m for aerial application and 15 m for ground application should be observed to protect water bodies.

Hazard Rating:

Ridomil Gold/Bravo, Ridomil Gold SL/Bravo

◈ Warning Poison – Eye irritant.

Ridomil Gold 480EC

▼ Caution Poison. Warning – Eye irritant.

Ridomil Gold 480SL

▼ Caution Poison. Warning – Eye irritant, skin irritant.

For an explanation of the symbols used here see page 11.

Scala SC

Fungicide Group – 9
(Refer to page 346)

Company:

Bayer CropScience – PCP#28011

Formulation:

400 g per L pyrimethanil formulated as a suspension concentrate. Container size - 2 L.

Crops, Diseases and Timing:

Control of early blight (*Alternaria solani*) on potato. Apply when plants are 15 to 20 cm high or when disease threatens. Repeat applications at 7 to 14 day intervals or as necessary to maintain disease control. If severe disease conditions exist, use the 7 day interval. Minimum spray interval is 7 days. Ensure complete coverage.

Rates:

Apply at 300 mL per acre as a tank mix with *Bravo 500*.

Application Information:

Water Volume:

Ground: Minimum of 120 L per acre.

Aerial: Minimum of 14 L per acre.

How it Works:

The active ingredient pyrimethanil is a anilinopyrimidine fungicide with contact and systemic activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicides: To be applied ONLY as a tank mix with *Bravo 500*. Follow mixing instructions provided on the label.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 6 applications or 2.4 L per acre of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 7 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: A 30 day plant-back interval is required for potatoes and wheat and 130 days for all other crops.

Storage: DO NOT allow product to freeze. If stored more than 1 year, shake well before using. Store in tightly closed container away from fertilizer, seeds, feed or food.

Environment: Maintain a 1 m buffer zone between areas sprayed and aquatic systems. Toxic to aquatic organisms; DO NOT apply where runoff is likely to occur.

Hazard Rating:

▽ Caution Poison – Skin Irritant.

For an explanation of the symbols used here see page 11.

Senator 70WP

Fungicide Group – 1
(Refer to page 346)

Company:

Nippon Soda Company Ltd. – PCP#25343
Distributed by Engage Agro Corporation

Formulation:

70% thiophanate-methyl formulated as wettable powder.

Container size - 2 kg.

Crops, Diseases and Timing:

Control of sclerotinia (white mould) (*Sclerotinia sclerotiorum*) on white beans. Apply when conditions favour disease (i.e. warm, humid weather and heavy, dense foliage), usually during early bloom stage and prior to rows closing in. If conditions favouring disease persist, repeat applications may be warranted.

Rates:

0.7 to 0.9 kg per acre (one container treats 1.67 to 2.14 acres)

Application Information:

Water Volume:

Ground: 400 L per acre.

Aerial: 20 to 24 L per acre.

How it Works:

The active ingredient thiophanate-methyl is a methylbenzimidazole carbamate fungicide with systemic activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered. *Senator 70WP* is compatible with most pesticides; DO NOT mix with lime or other alkaline materials.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: No restrictions listed.

Grazing: DO NOT feed or allow livestock to graze on treated crops.

Preharvest interval: No restrictions listed.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store in a dry place.

Environment: DO NOT apply to any body of water. Avoid drifting of spray onto any body of water or non-target areas. Specified buffer zones should be observed.

Hazard Rating:

None listed.

Serenade Max/Serenade CPB

Fungicide Group – 44
(Refer to page 346)

Company:

Bayer CropScience
(*Serenade Max* – PCP#28549; *Serenade CPB* – PCP#30143)

Formulation:

Serenade Max: 14.6% *Bacillus subtilis* (QST 713 strain) formulated as a wettable powder. Container size - 5.44 kg.

Serenade CPB: 1.34% *Bacillus subtilis* (QST 713 strain) formulated as an suspension concentrate. Container size - 2 x 9.46 L per case, 511 L and 1000L tote.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Suppressed:	Application Rate (per Acre)		Application Timing:
		Serenade Max	*Serenade CPB*	
Dry bean, chickpea, lentil, field pea	White mould (*Sclerotinia sclerotiorum*), botrytis blight or pod rot (*Botrytis cinerea*)	1.2 to 2.4 kg	1.6 to 6.1 L	Product should be applied prior to or in the early stages of disease development; repeat applications on 7 to 10 day intervals if conditions for disease persist. Use maximum label rates and shortened spray intervals for conditions conducive to rapid disease development. When conditions are conducive to heavy disease pressure, use in a rotational program with other registered fungicides.
Soybean	Sclerotinia stem rot (*Sclerotinia sclerotiorum*)	1.2 to 2.4 kg	1.6 to 6.1 L	Begin application soon after emergence and when conditions are conducive to disease development. Repeat as necessary on a 7 to 10 day interval.
	Brown spot (*Septoria glycines*)	0.1 to 0.4 kg	0.4 to 1.6 L	
Potato	Sclerotinia stem rot (*Sclerotinia sclerotiorum*), early blight (*Alternaria solani*)	1.2 to 2.4 kg	–	Begin application soon after emergence and when conditions are conducive to disease development. Repeat as necessary on a 7 to 10 day interval.
Canola, flax, borage, camelina, mustard	Sclerotinia stem rot (*Sclerotinia sclerotiorum*)	0.1 to 0.4 kg	0.4 to 1.6 L	Begin application at 20% to 30% bloom. A second application may be made 7 to 10 days later, at approximately 50% bloom and prior to significant petal fall, if conditions for disease development remain favourable. Use higher rates in fields with a history of heavy disease pressure.
Canola, flax, borage, camelina, mustard	Sclerotinia stem rot (*Sclerotinia sclerotiorum*)	0.25 to 0.64 kg	–	Begin application at 20% to 30% bloom. A second application may be made 7 to 10 days later, at approximately 50% bloom and prior to significant petal fall, if conditions for disease development remain favourable. Use higher rates in fields with a history of heavy disease pressure.

Continued

Crops, Disease, Rates and Timing *continued*:

Crop:	Diseases Suppressed:	Application Rate (per Acre)		Application Timing:
		Serenade Max	*Serenade CPB*	
Caraway, coriander, fenugreek	Botrytis gray mould (*Botrytis cinerea*); white mould (*Sclerotinia sclerotiorum*)	1.2 to 2.4 kg	–	Begin application when environmental conditions are conducive to disease development. Repeat as necessary on a 7- to 10-day interval.

Application Information:

Water Volume:

Use water volumes to give good canopy penetration and coverage of plant parts to be protected.

Ground application only for all crops, except canola (ground or air).

How it Works:

Bacillus subtilis is a bacterium that works as a biofungicide to prevent infection of labeled diseases by multi-site biochemical activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: No restrictions listed.

Grazing: No restrictions listed.

Preharvest interval: Can be applied up to and including the day of harvest.

Re-entry: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Maximum storage period of two years at room temperatures up to 25°C. Store in a dry area inaccessible to children. Store in original container.

Environment: DO NOT contaminate water, food, or feed by storage and disposal.

Hazard Rating:

None listed.

Potential skin sensitizer.

Tanos 50 DF

Fungicide Group – 11, 27

(Refer to page 346)

Company:

E.I. duPont Canada Company – PCP# 27435

Formulation:

25% famoxadone and 25% cymoxanil formulated as a dry flowable.

Container size - 2.5 to 5 kg.

Crops, Diseases and Timing:

Potato - Early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*). Make the first application following one or two applications of a preventative broad spectrum fungicide such as chlorothalonil or mancozeb. A minimum 12 day application interval must pass between the 1st and 2nd application of *Tanos 50 DF*. A minimum 24 day application interval must pass between the 2nd and 3rd application of *Tanos 50 DF* Fungicides other than *Tanos 50 DF* may be used as necessary to protect the crop during these intervals.

Rates:

225 to 340 g per acre.

Application Information:

Water volume: Use sufficient water to obtain thorough coverage. With a conventional sprayer use no less than 100 to 120 L per acre. With an air-assisted sprayer use no less than 44 L per acre. Ground application only.

How it Works:

The active ingredient cymoxanil is a cyanoacetamide-oxime fungicide with locally systemic activity. The active ingredient famoxadone is a strobilurin fungicide with broad spectrum activity. To be used as a preventative, curative and inhibitive (against sporulation) fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered. Tank mix solutions containing boron may affect product solubility. When using boron containing solutions, add the correct amount of *Tanos 50 DF* first and boron containing solution last.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 6 applications of this product per season.

Grazing: No restrictions listed.

Preharvest interval: 14 days.

Re-entry: DO NOT re-enter treated areas within 24 hours of application.

Re-cropping: Crops that are on the product label may be planted back at any time. A 30-day plantback interval is required for cereal grains. All other crops may be planted following a 1 year interval.

Storage: Store product closed in original container only. Protect against humid air and water. Avoid contact with food, drink and livestock feed material.

Environment: Toxic to fish and aquatic organisms. Observe prescribed buffer zones. Toxic to birds, mammals and harmful to beneficial arthropods. Minimize off-target drift to reduce the effects on wildlife at the field boundary. DO NOT apply to areas prone to run-off.

Hazard Rating:

◈ Warning Poison – Eye Irritant.

For an explanation of the symbols used here see page 11.

Tattoo C

Fungicide Group – 28, M5

(Refer to page 346)

Company:

Bayer CropScience – PCP#24544

Formulation:

375 g per L propamocarb HCl and 375 g per L chlorothalonil formulated as a suspension concentrate.
Container size - 10 L.

Crops, Diseases and Timing:

Control of late blight (*Phytophthora infestans*) on potato. Begin applications when conditions are favorable for disease, but before infection, and continue on 7 to 14 day intervals until threat of disease is over. Use the 7 day interval when the risk and conditions for disease are high. To avoid resistance, rotating and alternating applications with fungicides having different modes of action is recommended if multiple fungicide applications are required.

Rates:

1.09 L per acre.

Application Information:

Water Volume (ground only): 80 to 120 L per acre.

How it Works:

The active ingredient propamocarb HCl is a carbamate fungicide with systemic activity. Chlorothalonil is a chloronitrile fungicide with contact activity. To be used as a preventative fungicide application. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 3 applications of this product per season.

Grazing: DO NOT feed treated crops to livestock.

Preharvest interval: 7 days.

Re-entry: DO NOT re-enter treated areas within 48 hours after treatment. If required, individuals may re-enter treated areas within 48 hours for short tasks not involving hand labour, provided that 4 hours have passed since application and that long pants and a long-sleeve shirt are worn.

Re-cropping: DO NOT plant a new crop in the treated area within 120 days of the last application.

Storage: Keep away from fire, open flame or other sources of heat. DO NOT store below freezing. Store the tightly closed container away from seeds, fertilizers, plants and food-stuffs.

Environment: DO NOT apply directly to water or areas where surface water is present. DO NOT apply where runoff is likely to occur. DO NOT contaminate water when disposing of equipment wash waters. Allow a buffer zone of 15 m around bodies of water when applying.

Hazard Rating:

⚠ Danger – Corrosive to eyes.

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Tebuconazole

Fungicide Group – 3
(Refer to page 346)

Folicur 432F/Folicur 250EW/Palliser/Fuse

Company:

Bayer CropScience (*Folicur 432F* – PCP#25940, *Folicur 250EW* – PCP#29820, *Palliser* – PCP#30491)

Syngenta Canada (*Fuse* – PCP#30492)

Formulation:

Folicur 432F/Fuse – 432 g per L tebuconazole formulated as a suspension. Container size – 4.73 L.

Folicur 250EW – 250 g per L tebuconazole formulated as an emulsion in water. Container size – 8.1 L.

Palliser – 432 g per L tebuconazole formulated as a suspension. Container size – 9.46 L.

Crop, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate (per acre):		Timing:
		Folicur 432F*/ Palliser*/ Fuse*	_Folicur 250EW_	
Wheat**	Suppression of fusarium head blight (_Fusarium_ spp.); control of septoria glume blotch (_Stagonospora nodorum_)	120 mL	200 mL	**Timing of application is critical:** Apply within the time period from when at least 75% of the wheat heads on the main stem are fully emerged to when 50% of the heads on the main stem are in flower. **Spray coverage is essential for optimum efficacy:** Spray equipment must be set to provide good coverage to heads (e.g. forward and backward mounted nozzles, or nozzles that have a two-directional spray).
	Control of tan spot (_Pyrenophora tritici-repentis_), septoria leaf blotch (_Septoria tritici_), leaf rust (_Puccinia triticina_) stem rust (_P. graminis_) stripe rust (_P. striiformis_)	90 to 120 mL	150 to 200 mL	Apply at the first sign or very early stage of disease, up to the end of the flowering stage. Use the higher rate when weather conditions are conducive for disease.
	Control of powdery mildew (_Erysiphe graminis_)	120 mL	200 mL	
Barley**	Control of net blotch (_Pyrenophora teres_), spot blotch (_Cochliobolus sativus_), scald (_Rhynchosporium secalis_), leaf rust (_Puccinia hordei_), stem rust (_P. graminis_), stripe rust (_P. striiformis_), septoria leaf blotch (_Septoria passerinii_), powdery mildew (_Erysiphe graminis_)	90 to 120 mL	150 to 200 mL	
Oat	Control of crown rust (_Puccinia coronata_), stem rust (_P. graminis_)	90 mL	150 mL	

Continued

Crop, Diseases, Rates and Timing *continued*:

Crop:	Diseases:	Application Rate (per acre):		Timing:
		*Folicur 432F**	*Folicur 250EW*	
Soybean	Control of powdery mildew (*Microsphaera diffusa*)***	—	150 to 200 mL	Apply when first symptoms of disease can be found or risk of infection is imminent. Use the higher rate when disease pressure is severe.

* *Folicur 432F*, *Palliser* and *Fuse* are recommended to be used with a registered non-ionic surfactant, such as *Agral 90* or *AgSurf*, at 1.25 L per 1000 L of spray solution.

** *Folicur 432F* and *Folicur 250EW* may be applied in sequence with *Prosaro 250 EC*. The minimum interval between applications is 7 days.

*** *Folicur 432F* is not registered for control of powdery mildew in soybeans.

Application Information:

Water Volume:

Ground: Minimum 40 L per acre. Ensure thorough coverage of all wheat heads. Avoid excessive water volumes (maximum 80 L per acre) at flowering time because this can increase the risk of infection.

Aerial: Minimum 19 L per acre.

How it Works:

The active ingredient tebuconazole is a triazole demethylation inhibitor (DMI) fungicide with systemic broad-spectrum activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Herbicides: In spring wheat and barley, *Folicur 432F Palliser* or *Fuse* may be tank-mixed with *Refine Extra* for leaf diseases and respective weeds controlled (consult labels). In spring wheat only, *Folicur 432F Palliser* or *Fuse* may be tank-mixed with *Buctril M* for leaf diseases and respective weeds controlled (consult labels).

Insecticides: For control of orange wheat blossom midge (*Sitodiplosis mosellana*) in wheat, *Folicur 432F*, *Palliser* or *Fuse* may be tank mixed with *Lorsban 4E* labeled rates. See respective labels for directions and use precautions.
Fungicides: None registered.

Bayer CropScience also supports the following mixes that are not on the *Folicur EW* label. Apply mixes according to the most restrictive use limitations for either product:

Insecticides: *Decis, Lorsban, Sevin XLR*

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed one application of this product per season.

Grazing: DO NOT allow livestock to graze or feed green forage to livestock prior to 6 days after treatment. Straw cut after harvest may be fed or used for bedding.

Preharvest inteval: 36 days.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: Treated areas may be replanted immediately following harvest with any crop listed on the *Folicur 432F/ Folicur 250EW* labels. For crops not listed on these labels, DO NOT replant treated areas for 120 days after last application.

Storage: Store in a cool, dry place and prevent cross contamination with other pesticides, fertilizers, food and feed.

Environment: Any products containing tebuconazole should not be used in areas treated with this product during the previous season (use only in alternate years). This product is toxic to birds, small wild animals, aquatic organisms, and non-target plants.

DO NOT apply directly to water, or to areas where surface water is present. Maintain a buffer zone of 30 m near aquatic areas. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

(!) Danger – Skin irritant.

▽ Caution – Eye irritant.

For an explanation of the symbols used here see page 11.

Topnotch

Fungicide Group – 11
(Refer to page 346)

Company:

ADAMA Canada –PCP#31126

Formulation:

143 g per L of azoxystrobin and 124 g per L of propiconazole as suspension concentrate.

Crops, Diseases, Rates and Timing:

Crops:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Wheat	Septoria leaf spot (*Septoria* sp.), tan spot (*Pyrenophora tritici-repentis*), stripe rust (*Puccinia striiformis*), wheat leaf rust (*Puccinia triticina*)	214 mL	Apply once between stem elongation and half- head emergence
Barley	Septoria leaf spot (*Septoria* sp.), net blotch (*Pyrenophora teres*), scald (*Rhynchosporium secalis*), barley leaf rust (*Puccinia hordei*), tan spot (*Pyrenophora tritici-repentis*), stripe rust (*Puccinia striiformis*)		
Oats	Septoria leaf spot (*Septoria* sp.), net blotch (*Pyrenophora teres*), crown rust (*Puccinia coronate* var. *avenae*)		
Rye	Septoria leaf spot (*Septoria* sp.), scald (*Rhynchosporium secalis*), tan spot (*Pyrenophora tritici-repentis*)		
Triticale	Septoria leaf spot (*Septoria* sp.), tan spot (*Pyrenophora tritici-repentis*)		

Application Information:

Water Volume:

Ground: Minimum of 40 L per acre.

Aerial: Minimum of 18 L per acre.

DO NOT apply during periods of dead calm

DO NOT apply aerially when wind speed is greater than 16 km per hour

How it Works:

Topnotch is composed of two active ingredients; azoxystrobin and propiconazole. Both active ingredients have systemic activity and this mixture can be used for broad spectrum coverage and preventative purpose. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed one application of this product per year.

Grazing:

Preharvest inteval: 45 days for cereals and straw; 30 days for forage and hay.

Re-entry: DO NOT re-enter treated areas within 12 hours of application.

Re-cropping: A plant back interval of 105 days is required for all crops not listed in this label. Oats and rye may be planted 45 days after application.

Storage: Store in original tightly closed container in a cool dry, well ventilated area away from feed and foodstuffs. DO NOT store below 0°C.

Environment: Avoid run-off from treated areas into aquatic areas. Toxic to aquatic organisms, certain beneficial insects and may leach to ground water. Avoid application when heavy rain in forecast.

Hazard Rating:

▽ Caution Poison– Eye and skin irritant.

For an explanation of the symbols used here see page 11.

Twinline

Fungicide Group – 3, 11
(Refer to page 346)

Company:

BASF Canada – PCP#30337

Formulation:

130 g per L pyraclostrobin and 80 g per L metconazole formulated as a liquid.

Container size – Case (2 x 8.1L); 64 L drum; 128 L Shuttle; or 400 L tote.

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Timing and Application Information:
Wheat, triticale	Tan spot (*Pyrenophora tritici-repentis*), septoria leaf blotch (*Septoria tritici* or *Stagonospora nodorum*), leaf rust (*Puccinia recondita*), spot blotch (*Cochliobolus sativus*), stripe rust (*Puccinia striiformis*), powdery mildew (*Erysiphe graminis* f. sp. *tritici*)	150 to 200 mL	Prior to disease development or at onset of disease. Optimal application timing is at the flag leaf stage. Use the 202 mL per acre rate to obtain extended protection with maximum yield benefits. **Water Volume:** ***Ground:*** Minimum of 40 L per acre. ***Aerial:*** Minimum of 20 L per acre.
Barley	Net blotch (*Pyrenophora teres*), spot blotch (*Cochliobolus sativus*), scald (*Rhynchosporium secalis*), stripe rust (*Puccinia striiformis*)		
Oats	Crown rust (*Puccinia coronata*)		
Rye	Leaf rust (*Puccinia recondita*), powdery mildew (*Erysiphe graminis*)		
Barley, rye, wheat (all types), triticale	Suppression of fusarium head blight (*Fusarium graminearum*) and control of all leaf diseases controlled by lower application rates.	456 mL	When weather is warm and wet at head emergence and flowering. For wheat and rye apply at 20% flowering, for barley apply between full head emergence to up to 3 days after full emergence of the main stem.

How it Works:

The active ingredient metconazole is a broad spectrum triazole demethylation inhibitor (DMI) fungicide with systemic activity. The active ingredient pyraclostrobin is a strobilurin fungicide with broad spectrum contact and systemic activity. Best utilized as a preventative application when environmental conditions are favourable for disease development. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 2 applications of this product per season.

Grazing: No restrictions listed.

Preharvest inteval: Apply no later than end of flowering.

Re-entry: DO NOT re-enter treated areas within 6 days.

Re-cropping: A plant back interval of 35 days is required for all crops not listed on the label.

Storage: Store in original tightly closed container. Protect from freezing.

Environment: Avoid run-off from treated areas into aquatic areas. Toxic to aquatic organisms, non-target terrestrial plants and small wild animals. For ground application, buffer zones must be 1 m for protection of terrestrial habitats and aquatic habitats greater than 1 m deep and buffer zones must be 5 m from aquatic habitats less than 1 m deep. For aerial application, buffer zones must be 10 m for protection of terrestrial habitats and aquatic habitats greater than 1 m deep and buffer zones must be 250 m from aquatic habitats less than 1 m deep.

Hazard Rating:

☠ Danger – Poison

Eye and skin irritant.

For an explanation of the symbols used here see page 11.

Vertisan

Fungicide Group – 7
(Refer to page 346)

Company:

E.I. duPont – PCP #30332

Formulation:

200 g/L penthiopyrad formulated as an emulsifiable concentrate.

Crops, Diseases, Rates and Timing:

Crop:	Diseases:	Application Rate* (per acre):	Application Timing:
Canola	Control of sclerotinia stem rot (*Sclerotinia sclerotiorum*)	500 to 600 ml	Apply at 20 to 50% bloom stage prior to disease development. Under high disease pressure, make a second application 7 to 14 days later.
Chickpea, lentil, field pea, dry bean, faba bean	Control of ascochyta blight (*Ascochyta* spp.)	400 to 600 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval.
	(*Botrytis cinerea*)	500 to 600 mL	
Wheat	Suppression of septoria leaf blotch (*Septoria tritici*); control of stem rust (*Puccinia graminis*), leaf rust (*P. recondita* f.sp. *tritici*)	485 to 700 mL	Begin applications prior to disease development and continue on a 7 to 14 day interval. For optimizing yield and flag leaf control, apply at Feeke's 9, 'flag leaf out'.
Barley	Suppression of septoria leaf blotch (*Septoria tritici*); control of stem rust (*Puccinia graminis*)		
Triticale	Suppression of septoria leaf blotch (*Septoria tritici*); control of stem rust (*Puccinia graminis*), leaf rust (*P. recondita* f.sp. *tritici*)		
Oats	Control of stem rust (*Puccinia graminis*)		
Rye	Control of leaf rust (*Puccinia recondita* f.sp. *tritici*)		

Continued

Crops, Diseases, Rates and Timing *continued*:

Crop:	Diseases:	Application Rate* (per acre):	Application Timing:
Corn	Control of common rust (*Puccinia sorghi*)	400 to 700 ml	Begin applications prior to disease development and continue on a 7 to 14 day interval. For suppression of grey leaf spot, add a non-ionic surfactant.
Soybean	Suppression of brown spot (*Septoria glycines*)	400 to 700 ml	Begin applications prior to disease development and continue on a 7 to 14 day interval.
Sunflower	Suppression of rust (*Puccinina helianthi*) and sclerotinia head rot (*Sclerotinina sclerotiorum*)	700 ml	Begin applications prior to disease development and continue on a 7 to 14 day interval.
Potato	Suppression of early blight (*Alternaria solani*)	400 to 700 ml	Begin applications prior to disease development and continue on a 7 to 14 day interval.
	(*Botrytris cinerea*)	500 to 600 ml	
	Suppression of stem rot (*Rhizoctonia solani*)	15.5 to 31 ml per 100 m row	In furrow at planting, using 1.4 to 1.75 L water per 100 row meters. Do not exceed 0.7 L per acre.

* Use higher rate and shorter interval when disease pressure is high.

Application Information:

Water Volume:

Ground: 45 L per acre.

Aerial: 16 L per acre. Use sufficient water to obtain thorough coverage of plants. DO NOT apply under periods of dead calm. Avoid application of this product when winds are gusty.

How it Works:

The active ingredient penthiopyrad is a carboxamide fungicide with broad spectrum, locally systemic and curative properties recommended for foliar and soil borne plant diseases. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344. Make no more than 2 sequential applications before switching to a fungicide with a different mode of action.

Maximum seasonal use rate: Canola, dry legumes, soybean – 1.2 L per acre, cereal grains, corn – 1.4 L per acre and sunflower – 1.8 L per acre, potato – 2 L per acre.

Grazing: Cereals, corn and soybeans may be used for grazing or forage 0 days after the last application.

Pre-harvest interval: DO NOT apply within the following number of days prior to harvest canola and dry legumes (21), soybean and sunflower (14), corn and potato (7), cereal grains – no restriction

Re-Entry: DO NOT re-enter treated areas until 12 hours after application. For corn detasselling do not enter treated areas for 3 days.

Re-cropping: Crops and crop groups on the *Vertisan* label as well as the following crops may be planted immediately after harvest: alfalfa, low growing berries (strawberries), *Brassica* (cole) leafy vegetable, bulb vegetable (onion), cucurbit vegetables (cucumber, melons, squash), fruiting vegetables (tomato, pepper), leafy vegetables (lettuce, celery, spinach), legume vegetables (succulent), root vegetables (carrot, radish, turnip). All other crops cannot be planted until 12 months after last application.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed.

Environment: This product is toxic to aquatic organisms. When using *Vertisan* consult the product label for buffer zones.

Hazard Rating:

(!) Danger – Eye irritant and skin irritant

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Zampro

Fungicide Group – 40, 45
(Refer to page 346)

Company:

BASF Canada – PCP#30321

Formulation:

225 g per L dimethomorph and 300 g per L ametoctradin formulated as a suspension concentrate.

Container size – 4 x 4.14 L

Crops, Diseases, Rates and Timing:

Crop:	Diseases Controlled:	Application Rate (per acre):	Application Timing:
Potato	Late blight (*Phytophthora infestans*)	320 to 400 mL	Begin applications prior to disease development and continue on a 5 to 10 day interval. Use the higher rate and shorter interval when disease pressure is high. The addition of a spreading/penetrating adjuvant is recommended to improve disease control performance.
	Tuber blight (*Phytophthora infestans*)	400 mL	When used in accordance to label recommendations, *Zampro* also reduces tuber blight when applied immediately prior to or after vine kill.

Application Information:

Water Volume:
Ground: Minimum of 80 L per acre.

Aerial: Minimum of 20 L per acre.

How it Works:

The active ingredient dimethomorph is a carboxylic acid amide fungicide with contact, systemic and antisporulant activity. The active ingredient ametoctradin is a quinone x inhibitor fungicide with contact and antisporulant activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT exceed 3 applications of this product per season

Grazing: No restrictions listed.

Preharvest Interval: 4 days.

Re-entry: Re-entry interval after application is 12 hours.

Re-cropping: A plant back interval of 30 days is required for all crops not listed on the label

Storage: Store in original tightly closed container. Protect from freezing.

Environmental Hazards: Avoid run-off from treated areas into aquatic areas. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Toxicity: Toxic to aquatic organisms.

Hazard Rating:

☠ Warning Poison – Eye Irritant.

For an explanation of the symbols used here see page 11.

Seed Treatment Tables

Table 6. Seed Treatment Products for Cereals and Grasses (except corn):

		CROPS									DISEASES									INSECTS
PRODUCTS	Page	Barley	Buckwheat	Grasses	Millet	Oat	Rye	Sorghum	Triticale	Wheat	Certain Early-Season Leaf Spotting Diseases (1)	Certain Smuts (2)	Common Bunt (3)	Fusarium spp. (4)	General Seed Rots (5)	Pythium Root Rot	Rhizoctonia spp.	Seedling Blight Complex & Common Root Rot (6)	Take-all	Wireworms
Allegiance FL		X		X	X	X	X	X		X						•				
Alias 240 SC		X				X				X										•
Armour / Armour RTU		X				X				X		•	•	•				•		
Belmont 2.7 FS		X		X	X	X	X	X	X	X						•				
Charter RTU		X				X				X		•	•	•				•		
Cruiser 5FS†		X	X		X		X	X	X	X										•
Cruiser Maxx Vibrance Cereals†		X				X	X		X	X	1*	2*	3*	•	•	•	•	•	7	•
Cruiser Vibrance Quattro†		X				X	X		X	X	1*	2*	3*	•	•	•	•	•	7	•
Gemini		X				X				X		•	•	7		7		7		
Insure Cereal		X				X	X		X	X		•	•	•		•		•		
Intego Solo		X			X	X	X		X	X						•				
NipIt Inside 600										X										•
NipIt Suite Cereals of Seed Protectant										X		•	•	•		•	•	•		•
Proseed†		X	X		X	X	X	X	X	X				•			•			
Rancona Apex		X				X	X		X	X	1**	•	3**	•				•		
Raxil MD		X				X				X	•	•	•	•		•		•		
Raxil PRO		X				X				X	•	•	•	•	•	•	•	•		
Raxil PRO Shield		X				X				X	•	•	•	•	•	•	•	•		•
Raxil WW		X				X				X	•	•	•	•		•		•		•
Sombrero		X				X				X										•
Stress Shield 600		X				X				X										•
Thiram 75 WP				X											5*					
Vibrance XL†		X				X	X		X	X	1*	2*	3*	•	•	•	•	•	7	
Vibrance XL Co-Pack†		X				X	X		X	X	1*	2*	3*	•	•	•	•	•	7	
Vibrance Quattro†		X				X	X		X	X	1*	2*	3*	•	•	•	•	•	7	
Vibrance 500 FS		X				X	X		X	X		7					•			
Vitaflo 280 / Vitaflo SP / Vitaflo		X				X	X		X	X	•	•	•	•	•	•		•		

† Available to commercial seed treaters only.

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

1. May include septoria leaf spot on wheat, net blotch and/or leaf stripe on barley (refer to product pages and labels for descriptions). *Exceptions: some products winter wheat only; **Rancona Apex barley only.
2. May include covered smut, false loose, and/or loose smut of wheat, barley, and/or oats (refer to product pages and labels for descriptions). *Exceptions: some products also include loose smut of triticale.
3. May include common bunt on wheat, rye, and triticale (refer to product pages and labels for descriptions). *Exceptions: some products also include dwarf bunt on rye and winter wheat; **Rancona Apex wheat only.
4. May include seed- and/or soil-borne *Fusarium* spp., general seed rots, seedling blight, root rot, damping off, and/ or crown and foot fot caused by *Fusarium* spp. (refer to product pages and labels for descriptions).
5. May include general seed rots caused by saprophytes such as *Alternaria, Aspergillus,* and/or *Penicillium* *some products do not specify pathogens
6. Common root rot complex includes *Cochliobolus sativus*.
7. Except oats.

Table 7. Seed Treatment Products for Oilseed Crops:

		CROPS					DISEASES							INSECTS	
PRODUCTS	Page	Canola	Mustard $^{(1)}$	Flax	Sunflower	Safflower	General Seed/Root/ Seedling Rots/Blights $^{(2)*}$	*Fusarium spp. (seed- and/or soil-borne) (2)*	Pythium spp. (soil-borne) $^{(2)}$	*Rhizoctonia solani (soil-borne) (2)*	*Alternaria (seed-borne)*	*Blackleg (seed-borne)*	Downy mildew (sunflower)	Flea Beetles	Cutworms
Allegiance FL		X			X				•				•		
Belmont 2.7 FS		X			X				•				•		
Fortenza		X	1*											•	•
Gaucho CS FL†		X	X						•	•	•	•		•	
Helix Vibrance		X	X					•	•	•	•	•		•	
Intego SOLO		X	1*	X					•						
Lumiderm		X	X											•	•
NipsIt Inside 600		X	1*											•	
Prosper EverGol†		X	X					•	•	•	•	•		•	
Prosper FX†		X						•	•	•	•	•		•	
Poncho 600†		X												•	
Rancona RS		X						•		•		•			
Sombrero 600 FS		X	1**											•	
Thiram 75WP			X			X	•								
Vibrance 500FS		X								•					
Vitaflo 280 / Vitaflo SP / Vitaflo				X				•		•					

† Available to commercial seed treaters only.

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

1. Refer to product pages and labels for specific information on mustard type - oilseed/condiment mustard; *may include *Brassica carinata*; **Sombrero for condiment mustard only.
2. Seed Rot, Seedling Blight, Damping-off, and/or Root Rot can be caused by a complex of *Fusarium*, *Pythium*, and/or *Rhizoctonia* *some products do not specify pathogens.

Table 8. Seed Treatment Products for Pulse Crops and Legumes (except soybean):

		CROPS								DISEASES									INSECTS			
PRODUCTS	Page	Alfalfa	Chickpea	Dry Beans	Fababean	Lentil	Lupin	Other Legumes (bird's-foot trefoil, clover, vetch, and sainfoin)	Pea	*Aphanomyces euteiches* (early season)	General Seed/Root/Seedling Rots/Blights (1)	*Botrytis* spp. (seed- and/or soil-borne) (1)	*Fusarium* spp. (seed- and/or soil-borne) (1)	*Pythium* spp. (soil-borne) (1)	*Rhizoctonia* spp. (soil-borne) (1)	spp. (seed- and/or soil-borne) (1)	Seed-borne anthracnose (2)	Seed-borne ascochyta (3)	Pea leaf weevil (pea only)	Potato leafhopper (dry bean only)	Seedcorn maggot (dry bean only)	Wireworms
Agrox FL			X	X		X			X		1*											
Allegiance FL		X	X	X		X[4]		X	X					•								
Apron Advance			X	X	X	X	X		X			•	•	•	•		2**	•				
Apron Maxx RTA / Apron Maxx RFC			X	X	X	X	X		X			•	•	•	•		2*	•				
Belmont 2.7 FS		X	X	X		X[4]		X	X					•								
Crown			X			X						1**	1**		1**			•				
Cruiser 5FS†			X	X	X	X			X										•	•	•	•
Cruiser Maxx Pulses†			X			X			X			•	•	•	•			•	•	•	•	•
Cruiser Maxx Vibrance Beans† (co-pack of *Cruiser Maxx Beans* and *Vibrance 500FS*)				X									•	•	•		•					
Heads Up Plant Protectant				X												•						
Intego SOLO Fungicide			X	X	X	X				•				•								
Stress Shield 600			X	X	X	X			X										5	•		•
Thiram 75WP		X		X					X		1*											
Trilex AL			X	X		X			X			•	•	•	•			•				
Trilex EverGol			X	X		X[4]			X			•	•	•	•			•				
Vibrance 500FS			X	X	X	X			X						•							
Vibrance Maxx RTA / Vibrance Maxx RFC			X			X			X			•	•	•	•			•				
Vitaflo 280 / Vitaflo SP / Vitaflo				X		X			X			1**	•	4	•		2*	3**				

† Available to commercial seed treaters only.

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

1. Seed Rot, Seedling Blight, Damping-off, and / or Root Rot can be caused by a complex of *Botrytis, Fusarium, Pythium, Rhizoctonia*, and / or *Sclerotinia* *some products do not specify pathogens; **some products lentil only.
2. Seed-borne anthracnose: *dry beans only; **dry beans, fababeans, and lupin.
3. Ascochyta blight caused by *A. rabiei* in chickpea, *A. lentis* in lentil, and *A. pisi* and *Mycosphaerella pinodes* in pea. *suppression of *A. rabiei* in chickpea only; ***Mycosphaerella* in pea only
4. Only for low-tannin lentils destined for export or seed production only.
5. Registered on both pea and faba bean for control of pea leaf weevil.

Table 9. Seed Treatment Products for Soybean:

PRODUCTS	Page	DISEASE									INSECTS		
		Aphanomyces euteiches (early season)	General Seed/Root/ Seedling Rots/Blights (1)*	*Botrytis* spp. (seed- and/or soil-borne) (1)	*Fusarium* spp. (seed- and/ or soil-borne) (1)	*Phytophthora* spp. (soil-borne) (1)	*Pythium* spp. (soil-borne) (1)	*Phomopsis* spp. (seed- or soil-borne) (1)	Rhizoctonia solani (soil-borne) (1)	*Sclerotinia* spp. (seed- and / or soil-borne) (1)	Seedcorn maggot	Soybean aphid	Wireworms
Agrox FL			•										
Allegiance FL						•	•						
Apron Advance					•	•	•	•	•				
Belmont 2.7 FS						•	•						
Cruiser 5FS†											•	•	•
Cruiser Maxx Vibrance Beans†					•	•	•	•	•		•	•	•
EverGol Energy					•		•	•	•				
Heads Up Plant Protectant									•	•			
Intego Solo Fungicide		•				•	•						
Sombrero											•	•	•
Stress Shield 600											•	•	•
Thiram 75WP			•										
Trilex AL				•	•			•	•				
Vibrance 500FS									•				
Vitaflo 280 / Vitaflo SP / Vitaflo					•			•					

† Available to commercial seed treaters only.

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

1. Seed Rot, Seedling Blight, Damping-off, and/or Root Rot can be caused by a complex of *Botrytis, Fusarium, Phytophthora, Pythium, Rhizoctonia,* and/or *Sclerotinia* *some products do not specify pathogens.

Table 10. Seed Treatment Products for Corn:

PRODUCTS	Page	DISEASE				INSECTS			
		Fusarium spp. (seed- and / or soil-borne)	*Pythium* spp.	*Rhizoctonia* spp.	Other Seed / Root Rots and Seedling Blights (1)	Seedcorn maggot (2)	Wireworms	Corn rootworm	Cutworms
Agrox FL					1*				
Allegiance FL			•						
Belmont 2.7 FS			•						
Cruiser 5FS†						•	•	•	
Fortenza							•		•
Intego Solo			•						
Maxim Quattro†		•	•	•	•				
NipsIt Inside 600						2*	•	•	
Poncho 600FS†						2*	•	•	
Proseed †					1*				
Sombrero							•		
Thiram 75 WP		•	•		•				
Vitaflo 280 / Vitaflo SP / Vitaflo		•	•		•				

† Available to commercial seed treaters only.

1. May include seed- and/or soil-borne saprophytes, *Aspergillus* spp., *Cladosporium* spp., *Penicillium* spp. *some products do not specify pathogens
2. Seedcorn maggot *some products include black cutworms and white grubs.

Table 11. Seed Treatment Products for Potato:

PRODUCTS	Page	DISEASE					INSECTS				
		Blackleg	*Fusarium* spp. $^{(1)}$	*Rhizoctonia solani* $^{(2)}$	Silver Scurf (*Helminthosporium solani*)	Verticillium Wilt	Colorado Potato Beetle	Potato Flea Beetle	Potato Leafhopper	Aphids	Wireworms
Actara							•		•	•	
Cruiser Maxx Potato Extreme			•	•	•		•		•	•	
Fortenza							•				
Heads Up Plant Protectant				•							
Imidacloprid Products (Admire SPT, Alias 240 SC)							•	•	•	•	
Mancozeb Products (Potato ST 16, Solan MZ and Tuberseal)			•								
Maxim D / Maxim PSP / Maxim MZ PSP			•	•	•						
NipsIt INSIDE 600							•	•	•	•	•
Senator PSPT		•	•		•	•					
Titan ST							•	•	•	•	•
Titan Emesto (co-pack of Emesto Silver and Titan ST)			•	•	•		•	•	•	•	•
Verimark							•	•			

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

Before using any pesticide on potatoes, consult the list of Agricultural Pesticide Approved for Use from Simplot Canada and McCain Foods (Canada)

1. May include seed piece decay and/or dry rot.
2. May include black scurf and/or stem and stolon canker.

Table 12. Seed Treatment Products for Potato Post-harvest:

PRODUCTS	Page	POST-HARVEST						
		Silver Scurf (*Helminthosporium solani*)	*Fusarium spp.* $^{(2)}$	*Rhizoctonia spp.*	Other Storage Rots (*Phoma, Oospora*)	Bacterial Soft Rot	Bacterial Ring Rot	*Phytophthora* spp $^{(3)}$
Confine / Confine Extra		•						•
General Storage Disinfectant $^{(1)}$							1	
Mertect SC		•		•	•			
Rampart								•
Stadium		•	•					
StorOx		•	•		2	•		

Refer to product pages and labels for specific information on pathogens and insects listed as well as expectations for control vs suppression.

Before using any pesticide on potatoes, consult the list of Agricultural Pesticide Approved for Use from Simplot Canada and McCain Foods (Canada)

1. Not for use on potatoes. Use for disinfecting potato storages and equipment..
2. May include storage rot, tuber rot, and/or dry rot (refer to product page/label).
3. May include *Phytophthora infestans* (late blight) and/or *Phytophthora erythroseptica* (pink rot).

Seed Treatment Product Pages

Agrox FL

Fungicide Group – M4
(Refer to page 346)

Company:

Norac Concepts Inc. – PCP#12028

Formulation:

30% captan formulated as a flowable suspension seed treatment.

Container sizes - 20 L, 415 L, 1000 L returnable container.

Crops and Rates:

Crop:	*Agrox FL* (per 100 kg seed)
Beans (various)	280 mL
Chickpea	280 mL
Lentil	280 mL
Peas (various)	280 mL
Soybean	280 mL
Corn (field)	120* to 200 mL
Corn (sweet)	240* to 340 mL

* Product is to be applied at this rate only by a professional applicator using equipment which will assure complete and uniform coverage.

Diseases Controlled:

Storage rot, seed decay, root rot, damping off, seedling blights.

Application Information:

For use prior to storage or as a seed treatment. Mix the recommended amount of *Agrox FL* with the amount of water required for the slurry treater equipment to be used. Seed treated by the slurry method should not be bagged or stacked until it has dried. A colourant must be added to this product to colour the treated seed.

How it Works:

The active ingredient captan is a phthalimide fungicide with multi-site protective activity. For more information refer to "Fungicide Modes of Action" on page 345.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled, "This seed has been treated with *Agrox FL*. Poisonous to man and animals. DO NOT use for food or feed. DO NOT sell to oil mills."

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: DO NOT freeze. Product must be stored at ambient temperatures above 0°C and must not be stored with herbicides, feed, food or fertilizer.

Environment: DO NOT contaminate food, feed, or any body of water.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Apron Advance/ Apron Maxx RTA/ Apron Maxx RFC

Fungicide Group –
Apron Advance – 1, 4, 12
Apron Maxx RTA/RFC – 4, 12
(Refer to page 346)

Company:

Syngenta Canada

Formulation and Rates:

Active ingredient:	Formulation:		
	Apron Advance (PCP #30627)	*Apron Maxx RTA* (PCP #27577)	*Apron Maxx RFC* (PCP #27577)
Fludioxonil	25 g/L	0.73%	2.31%
Metalaxyl-M and S-isomer	20 g/L	1.10%	3.46%
Thiabendazole	150 g/L	–	–
Container sizes:	–	56.78L	56.78L
Rates:	100 mL per 100 kg of seed	325 mL per 100 kg of seed	100 mL per 100 kg of seed

Crops and Diseases (*Apron Advance, Apron Maxx RTA* and *Apron Maxx RFC*):

Crop:	Diseases Controlled by *Apron Advance:*
Chickpea, lentil, field pea, dry bean, fababean, and lupin	Seedling blights, damping-off, and seed rots caused by *Pythium, Fusarium,* and *Rhizoctonia* spp.
Chickpea	Seed-borne ascochyta blight (*Ascochyta rabiei*); seed rot and seedling blight caused by seed-borne *Botrytis* spp.
Lentil	Seed-borne ascochyta blight (*Ascochyta lentis*); seed rot and seedling blight caused by seed-borne *Botrytis* spp.
Field pea	Seed-borne ascochyta and foot rot (*Ascochyta pinodes*)
Dry bean	Seed-borne anthracnose (*Colletotrichum* spp).

Additional Crops and Diseases (*Apron Advance ONLY*):

Crop:	Diseases Controlled by *Apron Advance:*
Fababean and lupin	Seed-borne anthracnose (*Colletotrichum* spp).
Soybean	Seedling blights, damping-off, and seed rots caused by *Pythium, Fusarium,* and *Rhizoctonia* spp. Seed rot and seedling blight caused by seed-borne *Phomopsis* spp. and early season root rot caused by *Phytophthora* spp.

Rates:

Apron Advance: 100 mL per 100 kg of seed.

Application Information:

Apron Advance is a seed treatment formulation for use in commercial seed treatment plants, and for on-farm treatment using auger treating only; do not use in hopper box or seed drill. *Apron Maxx RTA* and *Apron Maxx RFC* are ready-to-apply seed treatment formulations for use in commercial seed treatment plants and for on-farm treatment using standard gravity flow or mist type seed treatment equipment. Also used in treat-on-the-go air seeders.

These products contain a pigment which will colour the treated seed. However, users are responsible for ensuring that the treated seed, when dried and ready for bagging, storage or seeding has an unnatural colour. If the pigment contained in the formulation does not colour the seed adequately, additional colourant must be added to the mixture while treating the seed. Ensure uniform coverage of the seed, as uneven seed coverage may not give the desired level of disease control. Treatment of highly damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour. Allow the seed to dry before bagging, storing or seeding.

How it Works:

Fludioxonil is a phenylpyrrole fungicide with contact activity. Metalaxyl-M is an acylalanine fungicide with systemic activity against diseases caused by the Oomycetes, including Pythium damping-off. Thiabendazole is a benzimidazole fungicide with both contact and systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Apron Maxx RFC is available in a co-pack with *Cruiser 5FS* (*Cruiser Maxx Pulses*). No other tank mixes listed.

Restrictions:

Resistance management: Refer to page 344. Experience has shown that strains of fungus resistant to metalaxyl-M may develop. Failure to control the disease will likely result in crop damage and / or yield losses. If disease appears in a treated field, consult the government extension specialist immediately.

Labelling: All seed treated with *Apron Maxx RTA* or *Apron Maxx RFC* must be labelled "This seed has been treated with fludioxonil and metalaxyl-M fungicides. DO NOT use for food, feed or oil purposes". All seed treated with *Apron Advance* must be labelled "This seed has been treated with thiabendazole, fludioxonil and metalaxyl-M and S-isomer fungicides. Do not use for food, feed or oil purposes".

Grazing: No restrictions listed.

Re-cropping: DO NOT plant any crop other than soybean, dry bean, chickpea, lentil or dry pea within 30 days to fields in which treated seed was planted.

Storage: Store away from feeds and feedstuffs. Store between 0 and 30°C. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned up.

Environment: This product is toxic to fish and other aquatic organisms. Do not apply directly to aquatic habitats; do not contaminate water by cleaning of equipment or disposal of wastes. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned up.

Compatibility with rhizobia-based inoculants: These products are compatible with rhizobia-based inoculants. Check with inoculant manufacturer for details and refer to product labels prior to use. Mixing with inoculants may increase drying time while treating. Recalibrate the seed drill before planting treated seed.

Hazard Rating:

None listed.

Crown

Fungicide Group – 1, 7
(Refer to page 346)

Company:

Platform Specialty Products – PCP#23430

Formulation:

92 g per L carbathiin and 58 g per L thiabendazole, formulated as a liquid seed treatment. Container size - 10 L, 200 L, 1000 L.

Crops, Diseases and Rates:

Crop:	Diseases Controlled:	Application rates (per 100 kg seed):
Lentil	Seed-borne ascochyta caused by *Ascochyta lentis*; seed rots and post-emergence damping off caused by *Botrytis, Fusarium* and *Rhizoctonia.*	300 to 600 mL *
Chickpea	Seed-borne ascochyta caused by *Ascochyta rabiei.*	300 to 600 mL**

* Use the higher rate to control seed-borne ascochyta in lentil.

** The lower rate will provide sufficient control of ascochyta in chickpea in most cases. Use the higher rate for smaller seed size varieties.

Application Information:

Commercial Treaters and On-Farm Auger Treating: *Crown* is a ready to use formulation designed for commercial treaters and on-farm auger treating. *Crown* is added directly to the seed as it enters a mixing chamber or auger. It is important that the seed and chemical be mixed quickly and uniformly. See instructions supplied with the applicable treater system for information on proper application techniques. When a grain auger is used for treating, running the auger less than full is the key to adequate mixing. Augers used for handling treated seed should not be used to move seed for food, feed or oil processing.

Applications to Seed in a Hopper Box or Seed Drill: Partially fill the hopper box or seed drill with a pre-measured amount of seed. Apply the proper amount of *Crown* evenly over the seed surface. DO NOT pour in one area. Mix with a paddle until all seed is of a uniform red colour, indicating adequate coverage. DO NOT MIX WITH HANDS. Repeat this procedure until the hopper box or seed drill is filled. Seed can be planted immediately after treatment without drying. Stir *Crown*-treated seed rigorously if the seeding operation has been interrupted for several hours or overnight.

How it Works:

The active ingredient carbathiin is a carboximide fungicide with systemic activity and the active ingredient thiabendazole is a benzimidazole fungicide with both contact and systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled "This seed has been treated with *Crown* seed protectant, which contains carbathiin and thiabendazole. DO NOT use for food, feed or oil processing."

Grazing: DO NOT graze or feed livestock on treated areas for 4 weeks after planting.

Re-cropping: No restrictions listed.

Storage: DO NOT store product above 35°C or below 0°C or in direct sunlight. Store in original container only, away from other pesticides, fertilizers, food or feed. Mix product prior to use by shaking the 10 L container.

Environment: Treated seed may be toxic to birds and other wildlife. Clean up any spilled seed. Ensure treated seed is properly incorporated at planting.

Compatibility with rhizobia-based inoculants: *Crown* is compatible with rhizobia and performs as a sticker for peat and granular inoculants. *Crown* and rhizobia can be applied simultaneously to seed through separate systems or applied sequentially. Read inoculant label before use.

Hazard Rating:

▽ Caution – Eye Irritant

For an explanation of the symbols used here see page 11.

Cruiser 5FS

Insecticide Group – 4
(Refer to page 493)

Contains insecticide only. On-farm use for cereals and pulses up to a maximum application rate of 30 g per 100 kg seed. Higher application rates for commercial seed treaters only.

Company:

Syngenta Canada – PCP#27045

Formulation:

47.6% thiamethoxam formulated as a suspension. Container size - 23.4L and 56.78 L.

Crops, Insects and Rates:

Crops:	Insects Controlled:	Rate per 100 Kg of seed[1]
Wheat and Barley	Wireworms (suppression)[2]	17 mL
	Wireworms (control)[2]	33 to 50 mL
Corn	Seed corn maggot	83 to 166 mL
	Wireworms	83 mL
Soybean	Seed corn maggot	50 to 83 mL
	Wireworms, soybean aphid	83 mL
Dry bean	Potato leafhopper[3]; seed corn maggot	50 to 83 mL
	Wireworms (suppression)[2]	17 mL
	Wireworms (control)[2]	33 to 50 mL
Pea, chickpea, faba bean lentil, and lupin	Pea leaf weevil (pea only)	50 to 83 mL
	Wireworms (suppression)[2]	17 ml
	Wireworms (control)[2]	33 to 50 mL
Rye, millet, buckwheat, sorghum, and triticale	Wireworms (suppression)[2]	17 mL
	Wireworms (control)[2]	33 to 50 mL

[1] Use the higher rate for fields that have a history of moderate to severe insect pressure.

[2] Use lower rate for early season suppression of wireworms. For control and/or moderate to high pressure, treat crops at higher rate.

[3] Use the higher rate to replace one application of a foliar insecticide spray.

Application Information:

For use only in commercial seed treatment facilities with closed transfer systems providing uniform seed coverage. A red colourant MUST be added when *Cruiser 5FS* is applied to grain. Treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and/or reduction of seed and seedling vigour. Allow the seed to dry before bagging or storing in bulk containers.

How it Works:

Thiamethoxam is a seed treatment insecticide in the neonicotinoid class of chemistry that controls listed chewing and sucking insects through contact and systemic activity. Refer to "Insecticide Groups Based on Modes of Action" on page 493.

Tank Mixes:

For control of seed and soil-borne diseases, *Cruiser 5FS* can be mixed with fungicide seed treatments in a closed transfer system. Refer to label for details.

Restrictions:

Resistance management: Refer to page 492.

NOTE: When using a seed flow lubricant for planting corn and soybean seed treated with neonicotinoid insecticides (containing the active ingredients clothianidin, imidacloprid or thiamethoxam), use only a dust-reducing fluency agent. Talc and graphite are not permitted.

Labelling: All seed must be labelled "Seed treated with thiamethoxam insecticide. DO NOT use for food, feed or oil processing."

Grazing: DO NOT graze or feed livestock on treated areas for 45 days after planting.

Re-cropping: No restrictions listed.

Storage: Store away from food and feed. Ideal storage temperature is above freezing and below 30°C. If product should freeze, bring to room temperature, then ensure the contents are mixed well prior to application.

Environment: Products are toxic to aquatic invertebrates and fish. DO NOT apply directly to water or areas where surface water is present. DO NOT contaminate food, feed, domestic or irrigation water supplies, lakes, streams and ponds. If treated seed is accessible to birds or spilled outdoors, promptly clean up or bury to prevent ingestion.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Cruiser Maxx Vibrance Beans

Insecticide Group – 4
Fungicide Group – 4, 7, 12
(Refer to page 346 and 493)

***Cruiser Maxx Vibrance Beans* is a co-pack containing *Cruiser Maxx Beans* and *Vibrance 500FS* (page 482). For more detailed information on the component products, consult product labels.**

Company:

Syngenta Canada

Formulation and Rates:

Active ingredient:	**Active Ingredient Formulation:**		
	Cruiser Maxx Beans **(PCP #28821)**	***Vibrance 500 FS*** **(PCP #30438)**	***Cruiser Maxx Vibrance Beans***
Container sizes:	56.78 L (available ONLY as co-pack)	1L to 1050 L	(co-pack of *Cruiser Maxx Beans* and *Vibrance 500 FS*)
Thiamethoxam (suspension)	22.6%	-	Rate: 195 mL *Cruiser Maxx Beans* plus 5 to 10 mL *Vibrance 500FS* per 100 kg of seed
Fludioxonil (liquid seed treatment)	1.12%	-	
Metalaxyl-M and S-isomer (liquid seed treatment)	1.70%	-	
Sedaxane (suspension)	-	500 g per L	

Crops, Diseases and Insects:

Crop:	Diseases Controlled:	Insects Controlled:
Soybean	Seed decay, seedling blight and damping-off caused by *Rhizoctonia solani*; seed rot / pre-emergence damping-off, and post-emergence damping-off caused by *Fusarium* spp., *Pythium* spp. and *Rhizoctonia* spp.; seedling blight caused by *Fusarium* spp., and *Pythium* spp.; seedling root rot caused by *Fusarium* spp.; seed rot and seedling blight caused by seed-borne *Phosmopsis* spp.; early season root rot caused by *Phytophthora megasperma* var. *sojae*.	Wireworm, seed corn maggot, European chafer, bean leaf beetle, and soybean aphid (early season protection)
Dry Bean	Seed rot / pre-emergence damping-off, and post-emergence damping-off caused by *Fusarium* spp., *Pythium* spp. and *Rhizoctonia* spp.; seedling blight caused by *Pythium* spp.; anthracnose caused by seed-borne *Colletotrichum* spp.	Wireworm, seed corn maggot, and potato leafhopper (replaces one foliar insecticide application)

Application Information:

For use only in commercial seed treatment facilities with closed transfer including closed mixing, loading, calibrating, and closed treatment equipment. No open transfer of seed treatments. All seed treated with this product must be conspicuously coloured at the time of treatment. Treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour.

How it Works:

Thiamethoxam is a seed treatment insecticide in the neonicotinoid class of chemistry that controls listed chewing and sucking insects through contact and systemic activity. For more information refer to "Insecticide Groups Based on modes of Action" on page 493. Metalaxyl-M is an acylalanine fungicide with systemic activity against diseases caused by the Oomycetes, including *Pythium* damping-off. The active ingredient fludioxonil is a phenylpyrrole fungicide with contact activity. The active ingredient Sedaxane is a succinate dehydrogenase inhibitor fungicide with systemic activity that inhibits fungal metabolism by binding to the succinate dehydrogenase enzyme to disrupt cellular respiration and energy generation. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Peas: When used at the low rate, *Cruiser Maxx Beans* may be tank-mixed with *Apron Maxx RTA*. Follow respective labels for diseases controlled and other instructions before tank-mixing.

Restrictions:

Resistance management: Refer to page 344.

NOTE: When using a seed flow lubricant for planting corn and soybean seed treated with neonicotinoid insecticides (containing the active ingredients clothianidin, imidacloprid or thiamethoxam), use only a dust-reducing fluency agent. Talc and graphite are not permitted.

Labelling: All seed must be labelled "This seed has been treated with the insecticide, thiamethoxam and metalaxyl M (including R- and S-isomer) and fludioxonil fungicides and sedaxane fungicide. DO NOT use for food, feed or oil processing."

Grazing: DO NOT graze or feed livestock on treated areas for 45 days after planting.

Re-cropping: DO NOT plant any crop other than soybeans, dry beans, chickpeas, lentils and dry peas (including field peas) within 45 days in which treated seeds were planted.

Storage: Store away from food and feed. Ideal storage temperature is above freezing and below 30°C. Repeated freeze-thawing of *Cruiser Maxx Beans* will not affect the physical integrity of the product. If product should freeze, bring to room temperature, then ensure the contents are mixed well prior to application.

Environment: This product is toxic to fish and other aquatic organisms. DO NOT apply this product directly to aquatic habitats, estuaries or marine habitats. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. DO NOT contaminate food, feed, domestic or irrigation water supplies, lakes, streams and ponds. If treated seed is spilled outdoors or in areas accessible to birds, promptly clean up or bury to prevent ingestion.

Compatibility with rhizobia-based inoculants: *Cruiser Maxx Beans* and *Vibrance 500FS* are compatible with rhizobium-based inoculants. Please check with inoculant manufacturers for details prior to use. Mixing with inoculants may increase drying time while treating extends the processing time. Recalibrate equipment before planting treated seed.

Hazard Rating:

Caution – Poison

Caution – Skin Irritant

For an explanation of the symbols used here see page 11.

Cruiser Maxx Potato Extreme

Insecticide Group – 4A
Fungicide Group – 3, 12
(Refer to pages 346 and 493)

Company:

Syngenta Canada

Formulation and Rates:

Active ingredient:	**Active Ingredient Formulation:**			**Diseases/Insects Controlled**
	Actara 240SC **(PCP #28407)**	***Maxim D*** **(PCP #30599)**	***Cruisier Maxx Potato Extreme*** **(PCP #31024)** suspension	
Thiamethoxam	240 g per L	-	250 g per L	Colorado potato beetle, aphids and potato leafhopper on potato
Fludioxonil	-	19.4 g per L	62.5 g per L	Seed piece treatment for the control of black scurf / stem and stolon canker (*Rhizoctonia solani*), silver scurf (*Helminthosporium solani*), Fusarium dry rot (*Fusarium* spp.)
Difenconazole	-	19.4 g per L	123 g per L	
Rate	7.9 to 24.4 ml[1] per 100 kg potato seed piece	65 to 130 mL[2] per 100 kg potato seed piece	20 mL per 100 kg seed	Note: when *Rhizoctonia solani* pressure is high or for control of black scurf, tank mix *Cruiser Maxx Potato Extreme* with *Maxim Liquid PSP* at a rate of 2.6 mL per 100 kg seed.

[1] Choose the appropriate rate from the chart on label, based on seeding rate.

[2] 130 mL per 100 kg of seed for control of black scurf / stem and stolon canker and silver scurf; 65 to 130 mL for control of fusarium dry rot (use the high rate when disease pressure and / or resistance pressure is high).

Restrictions:

Resistance management: Refer to page 344.

Re-cropping: Treated areas may be replanted immediately following harvest or as soon as practical following the last application with any crop listed on this label or to sorghum, wheat, barley, canola and pome fruit. Any cover crop planted for erosion control or soil improvement may be planted as soon as practical following the last application. However, the cover crop may not be grazed or harvested for food or feed. For all other crops, a 120 day plant-back interval must be observed.

Labelling: Treated seed pieces should be labelled "Poisonous to man and animals. This seed has been treated with mancozeb for the control of fusarium decay. Do not use for food or feed purposes."

Grazing: No restrictions listed.

Storage: If soil conditions are ideal, plant potatoes immediately after application; however if soil is predicted to be cold and wet for 3 days following application, either a) wait to cut, treat, plant until conditions are favorable or b) cut, treat and store. If cutting, treating and storing, potatoes can be treated with an inert dust to improve suberization. Store properly until conditions improve by making sure that there is adequate cool air (7-10 °C) movement through the pile of cut seed potatoes and a relative humidity of 85-90%. Temperatures above 10 °C promote soft rot in seed. Cut and treated seed should not be piled above 1.8 m in height. Avoid storing treated potatoes for over 2 weeks. When trans porting cut and treated seed make sure the seed is covered.

Environment: DO NOT apply any subsequent application of thiamethoxam in-furrow or foliar application or other Group 4 insecticide following seed piece treatment with Cruiser Maxx Potato Extreme. DO NOT apply more than 468 mL product per hectare. As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Cyantraniliprole

Insecticide Group – 28
(Refer to page 493)

Company

E.I. du Pont Canada Company – (*Lumiderm* – PCP#30894; *Verimark* – PCP#30892)

Syngenta Canada – (*Fortenza* – PCP#30899)

Formulation:

Fortenza: 600 g per L cyantraniliprole formulated as a suspension.
Container size – 1 to 1050 L

Lumiderm: 625 g per L cyantraniliprole formulated as a suspension.
Container size – 100 L, 1000 L, Bulk

Verimark: 200 g per L cyantraniliprole formulated as a suspension.

Crops, Rates, and Insects:

Product:	Crop:	Rate per 100 kg of seed:	Insects:
Verimark	Potato	Seed piece treatment: 45 mL In-furrow application: 6.75 to 9 mL per 100 m of row	Colorado potato beetle, potato flea beetle*
Fortenza	Potato	10 to 22.5 mL	Colorado potato beetle*
	Corn	83 to 167 mL	Cutworm
		167 mL	Wireworm
	Canola, rapeseed, mustard (oilseed and condiment mustard including *Brassica carinata*)	500 mL	Cutworm
		1333 mL	Flea beetles
Lumiderm	Canola, rapeseed, oilseed mustard	480 to 960 mL	Cutworms**
		960 to 1600 mL	Flea beetle

* Protection provided during early to mid-season growth and development of potatoes only.

** The *Lumiderm* application rate for flea beetles will also provide some early season protection from cutworm feed damage

Application Information:

For corn and registered oilseed crops *Fortenza* and *Lumiderm* must be applied in a commercial seed treatment facility using closed transfer equipment. These products contains no colourant. An appropriate seed colourant must be added when this product is applied. *Fortenza* is designed for on-farm treating for **potato seed pieces only** using a closed-treatment system. *Verimark*: **In-furrow application:** apply as a narrow band in-furrow. For best results, direct spray on the seed pieces in the furrow. **Potato seed-piece treatment:** Apply only in areas with adequate ventilation or areas equipped to remove spray mist or dust.

How it Works:

The active ingredient cyantraniliprole is a systemic insecticide from the diamides chemical class. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493.

Tank Mixes:

Lumiderm: registered oilseed crops - *Prosper EverGol Seed Treatment* or *Helix Xtra Seed Treatment*

Fortenza: registered oilseed crops - *Helix Xtra* and/or *Vibrance 500 FS*; Corn - *Cruiser 5FS, Apron XL LS, Maxim XL, Dynasty 100FS, Maxim Quattro* and/or *Vibrance 500 FS*

Follow the label directions for each product and use the most restrictive precautions and limitations.

Restrictions:

Resistance management: Refer to page 492. DO NOT apply any subsequent application of a Group 28 insecticide (in-furrow, soil or foliar) following treatment with any of these products.

Labelling: Seed treated with *Lumiderm* must be labeled "This seed has been treated with *Lumiderm Insecticide Seed Treatment* which contain cyantraniliprole. DO NOT use for feed, food or oil processing. Store away from feeds and other foodstuffs. Wear long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. This product is toxic to aquatic organisms. Dispose of all excess treated seed. Left over treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. Dispose of seed packaging in accordance with local requirements. Cover or incorporate spilled treated seeds."

Seed treated with *Fortenza* must be labeled "These seeds have been treated with the insecticide cyantraniliprole. When handling and planting treated seed, workers must wear a long sleeved shirt and long pants, chemical-resistant gloves, and work boots. For good hygiene practice, it is also recommended that a NIOSH-approved dust mask be worn during all job activities. Plant treated seed only with closed cab planting equipment. Do not use for food, feed or oil processing. Toxic to bees. Follow best management practices to help minimize dust exposure to pollinators during planting of treated seed; refer to the complete guidance "Pollinator Protection: reducing risk of planting treated seed" on the Health Canada website."

Grazing: No restrictions listed.

Re-cropping: Registered crops, as well as flax, sunflower, and safflower, may be replanted at any time. For all other crops, do not plant-back within 30 days of seeding with cyantraniliprole treated seed.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed. To prevent contamination store this product away from food or feed. Fortenza :Ideal storage temperature for the products in above freezing and below 30°C. Repeated freeze-thawing of *Fortenza* will not affect the physical integrity of the product. If the product should freeze, bring the product back to room temperature and ensure the contents are mixed well prior to application.

Environment: Toxic to aquatic organisms and bees. When this product is applied and used according to label directions, risk to bees is expected to be negligible. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. The use of this chemical may results in contamination of groundwater particularly in areas where soils are permeable and / or the depth to the water table is shallow.

Hazard Rating:

▽ Caution – Eye irritant.

For an explanation of the symbols used here see page 11.

EverGol Energy

Fungicide Group – 3, 4, 7
(Refer to page 346)

Company:

Bayer CropScience – PCP#30364

Formulation:

38.4 g per L penflufen, 76.8 g per L prothioconazole, 61.4 g per L metalaxyl formulated as a suspension.

Container size - 33.75 L.

Crops, Diseases, and Rates:

65 mL per 100 kg soybean seed to treat seed rot/pre-emergence damping off caused by *Rhizoctonia solani, Fusarium* spp., *Pythium* spp., and *Phomopsis longicolla*; post-emergence damping-off caused by *R. solani, Fusarium* spp., and *Pythium* spp.; early-season root rot and seedling blight caused by *R. solani* and *Fusarium* spp.; seedling blight caused by seed-borne *Botytritis cinerea*.

Application Information:

Evergol Energy is designed for commercial or on-farm treating with conventional seed treating equipment which can accurately control application rates and provide a good distribution of the chemical into the seed in the mixing chamber. This product is recommended to be diluted with water or another suitable liquid just prior to application to ensure uniform coverage on the seed during the application process. Uniform application to seed is necessary to ensure optimum product performance. This product contains no dye and an appropriate seed colourant must be applied.

How it Works:

The active ingredient penflufen is a carboxamide (SDHI) fungicide with systemic activity. The active ingredient prothioconazole is a demethylation inhibitor with broad-spectrum systemic activity. The active ingredient metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Insecticide Seed Treatments: *Stress Shield 600.*

Fungicide Seed Treatment: *Allegiance FL* for control of early-season *Phytophthora* in soybean.

Follow the label directions for each product and use the most restrictive precautions and limitations for either product.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labeled "This seed has been treated with *EverGol Energy*, which contains penflufen, prothioconazole and metalaxyl. When handling treated seed wear a long-sleeved shirt, long pants and chemical-resistant gloves. DO NOT use for feed, food or oil processing. Store away from feeds and other foodstuffs."

Grazing: No restrictions listed

Re-cropping: Registered crops for *EverGol Energy*, as well as canola, mustard, rapeseed, borage, flax, crambe and potato, may be replanted at any time. For all other crops, do not plant-back within 30 days of seeding with *EverGol Energy*-treated seed.

Storage: To prevent contamination store this product away from food or feed. Store in cool, dry area. DO NOT store in direct sunlight. DO NOT allow prolonged storage in temperatures that exceed 40°C or go below -10°C.

Environment: Toxic to aquatic organisms and non-target terrestrial plants. DO NOT discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other water. Dispose of all excess treated seed. Left over seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. DO NOT leave exposed treated seed on soil surface. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface. The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or depth to the water is shallow.

Hazard Rating:

None listed.

Gaucho CS FL

Fungicide Group – 7, M3
Insecticide Group – 4A
(Refer to page 346 and 493)

***Gaucho CS FL* is available to commercial seed treaters only.**

Company:

Bayer CropScience – PCP#27174

Formulation:

285.7 g per L imidacloprid, 47.6 g per L carbathiin, 95.3 g per L thiram formulated as a suspension.

Container sizes - 10, 100, 1000 L.

Crops, Diseases, Insects and Rates:

Crop:	Rate per 100 kg seed[1]:	Insects Controlled[2]:	Diseases Controlled:
Canola, rapeseed, and mustard (including oilseed mustard)	1400 to 2100 mL	Early season control of flea beetles.	Seed rot, damping off, seedling blight and early season root rot caused by *Rhizoctonia, Pythium* and *Alternaria* spp.; Seed-borne blackleg (*Leptosphaeria maculans*)[3]

[1] In areas where flea beetle populations are often high, use the higher rates.
[2] Under high insect pressure, a foliar insecticide may also be required. Monitor crop regularly for insect infestation levels.
[3] In canola and rapeseed only.

Application Information:

For use in commercial seed treaters only. Seed treatment must be thoroughly agitated to ensure uniform mixing of product prior to and during application. DO NOT apply direct heat to container. These products DO NOT contain colourant. A blue colourant must be added when products are applied to oilseeds. Treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and/or reduction of seed and seedling vigour.

How it Works:

Imidacloprid is a chloronicotinyl insecticide with systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493. Carbathiin is a carboximide fungicide with systemic activity and thiram is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344 and 492.

Labelling: Treated seed must be labelled as follows: "This seed has been treated with *Gaucho CS FL* seed protectant, which contains imidacloprid, carbathiin and thiram. Do not use for food, feed or oil processing. Store away from feeds and other foodstuffs. Wear a long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seeds."

Grazing: DO NOT graze or feed livestock on treated areas for 4 weeks after planting.

Re-cropping: No restrictions listed.

Storage: Protect products from freezing. Keep above 10°C prior to and during application. DO NOT store in direct sunlight or above 35°C. Treated seed stored for periods in excess of 9 months should be tested for germination before planting. DO NOT store treated seed above 25°C or in direct sunlight.

Environment: These products are highly toxic to birds and aquatic invertebrates. DO NOT apply directly to water or to areas where surface water is present. DO NOT contaminate water when disposing of equipment wash water. Cover or incorporate spilled treated seeds. Leftover treated seed should be double sown around the headlands, or buried away from water sources.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Gemini

Fungicide Group – 3, M3
(Refer to page 346)

Company:

BASF Canada – PCP#27826

Formulation:

1.25% triticonazole and 12.5% thiram formulated as a liquid flowable seed treatment. Container size - 2 x 6 L; 200 L.

Crops, Rates and Diseases:

Crop:	Rate per 100 kg seed:	Diseases Controlled:	Diseases Suppressed*:
Wheat	360 mL	Seed rot caused by *Fusarium* spp.; seedling blights caused by seed and soil-borne *Fusarium* spp.; loose smut (*Ustilago tritici*); common bunt (*Tilletia tritici, T. laevis*); *Pythium* damping off	*Fusarium* crown and root rot; seedling blight and common root rot caused by *Cochliobolus* sp.
Barley	360 mL	Seed rot caused by *Fusarium* spp.; seedling blights caused by seed and soil-borne *Fusarium* spp.; true loose smut; (*Ustilago nuda*); covered smut (*U. hordei*); false loose smut (*U. nigra*); *Pythium* damping off	*Fusarium* crown and root rot; seedling blight and common root rot caused by *Cochliobolus* sp.
Oats	360 mL	Loose smut (*Ustilago avenae*), covered smut (*U. kolleri*)	–

* Suppression means consistent control at a level which is not optimal but is still of commercial benefit.

Application Information:

Gemini is a ready-to-use seed treatment for use in commercial seed treatment plants and for use in on-farm standard gravity flow or mist type treatment machines. *Gemini* can also be used in on-the-go air seeder treatment systems. Agitate or shake well prior to usage.

Water volume: *Gemini* does not require the addition of water for application. When using the Flexi-Coil "on-the-go" seed treatment unit, please contact BASF AgSolutions at 1-877-371-2273 for details on product rates.

How it Works:

The active ingredient triticonazole is a triazole fungicide with broad-spectrum systemic activity. Thiram is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled "This seed is treated with *Gemini* seed treatment fungicide containing triticonazole and thiram. DO NOT use for food, feed or oil processing".

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store in original container with lid tightly closed. Store away from children, animals, food, feed stuffs, fertilizers and seed. Protect from frost and freezing. DO NOT store treated seed for more than 18 months. Store treated seed in cool, dry conditions.

Environment: DO NOT feed treated seed to, or otherwise expose, wildlife or domestic birds. DO NOT contaminate domestic or irrigation water supplies, lakes, streams, ponds or any body of water with the chemical, used containers, treated seed or bags. DO NOT contaminate water by cleaning of equipment or disposal of wastes.

Hazard Rating:

Caution – Poison

Caution – Eye irritant and potential skin sensitizer

For an explanation of the symbols used here see page 11.

General Storage Disinfectant

Company:

Ag-Services Inc –PCP#14957

Distributed by JEM Holdings Inc. in Saskatchewan and by White Potato Services Ltd. in Manitoba

Formulation:

10% dimethyl benzyl ammonium chloride, formulated as a liquid. Container size - 20 L.

Crops:

Use for disinfecting storage areas and equipment. Not for direct use on potatoes.

Diseases:

Control of bacterial ring rot and other decay organisms in potato storage.

Rate:

60 mL per 10 L water.

Application Information:

Apply only when storage areas are empty. To disinfect walls and floors of potato storages, clean surfaces thoroughly with a broom or vacuum to remove all dirt and debris. Wash with detergent prior to disinfecting. Then, wash, mop or spray thoroughly with disinfectant solution (60 mL disinfectant in 10 L of water). Allow treated surfaces to remain wet for at least 20 minutes. The same strength solution can be used to disinfect used bags, potato planters and other machinery after all dirt has been removed. Soak bags for at least 1 hour.

Equipment: All handling and planting equipment should be cleaned and treated on a regular basis (daily when preparing seed and seed pieces). Dirt should be removed through washing with detergent prior to disinfection. Treat equipment by mopping and brushing methods.

Storage walls and ceilings: Use 600 mL of disinfectant in 100 L of water. Wash areas with detergent prior to disinfecting. Spray areas using a high pressure jet (up to 4250 kPa pressure) to penetrate cracks, etc. in floors. Spray storage air ducts with a solution of 1.2 L of disinfectant in 100 L of water. Sub-surface air ducts, flumes and plenums should be thoroughly cleaned prior to disinfection.

Tank Mixes:

DO NOT mix with soaps, detergents, foaming agents or surfactants.

Hazard Rating:

▽ Caution – Corrosive

Other precaution: Corrosive, causes severe eye and skin damage. DO NOT get in eyes, on skin or on clothing. Avoid contamination of food. DO NOT breathe mist of diluted chemical created from pressure washer applications. Wear gloves, goggles, rubber boots, wet suit, and mist respirator when using pressure washer system.

For an explanation of the symbols used here see page 11.

Heads Up Plant Protectant

Fungicide Group – NC
(Refer to page 346)

Company:

Heads Up Plant Protectants, Inc.– PCP#29827
Distributed by Engage Agro Corporation

Formulation:

63.02% saponins of *Chenopodium quinoa* formulated as a soluble powder.

Container size - 25 g pouches

Crops and Diseases:

Crop:	Diseases Suppressed:
Potato (cut or whole tubers)	Rhizoctonia canker and black scurf (*Rhizoctonia solani*)
Soybean	Root rot and post-emergence damping-off (*Rhizoctonia solani*); white mould (*Sclerotinia sclerotiorum*)
Dry bean	White mould (*Sclerotinia sclerotiorum*)

Rate Information:

Mix 1 gram of product per 1 L of water. Apply 1 L of solution for every 100-264 kg of potato seed or for every 163 kg of soybean or dry bean seed.

Application Information:

Treat soybean or dry bean seed by dipping, spraying or dribbling the solution into a rotation auger conveyor or some other approved seed treatment device. Spray application to seeds within an enclosed spray device to ensure thorough coverage.

For seed potatoes, product must be applied to germination seed potatoes, as indicated by obvious sprouting activity coming from potato eyes. This sprouting activity can be from peeking to full sprout length, but before green leaves appear.

How it Works:

The active ingredient saponins of *Chenopodium quinoa* is made from plant sources. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store this product away from food or feed. Store above -12°C.

Environment: DO NOT contaminate irrigation or drinking water supplies or aquatic habitats. This product is toxic to aquatic organisms.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Helix Vibrance

Available to commercial seed treaters only.

Fungicide Group – 3, 4, 12, 7
Insecticide Group – 4A
(Refer to page 346 and 493)

Company:

Syngenta Canada - PCP# 31454

Formulation:

269 g per L thiamethoxam, 16 g per L difenoconazole, 5 g per L metalaxyl-M and S isomer, 1.7 g per L fludioxonil, and 3.4 g per L sedaxane formulated as a suspension.

Container size - 105 L to Bulk.

Crops:

Canola, rapeseed, and mustard seed (both oilseed and condiment types), including *Brassica carinata*.

Diseases Controlled:

Seed-borne blackleg (*Leptosphaeria maculans*), seed-borne *Alternaria*, and the seedling disease complex (damping off, seedling blight, seed rot, root rot) caused by *Pythium*, *Fusarium* and *Rhizoctonia* spp.

Insects Controlled:

Early season control of flea beetles (28 to 35 days).

Rate:

1.5 L product per 100 kg seed

Application Information:

For use only in commercial seed treatment facilities with closed transfer systems. *Helix Vibrance* is a premix formulation that includes a pigment. However, users are responsible for ensuring that the treated seed, when dried and ready for bagging, has an unnatural colour. If the pigment contained in the formulation does not colour the seed adequately, or to optimize seed coverage, water, additional colourant and polymers can be added to facilitate application. Use standard commercial seed treatment equipment that provides uniform seed coverage to ensure desired level of insect or disease control. Maintain constant product agitation during the seed treatment process. Allow the seed to dry before bagging. Treatment of highly mechanically scarred or damaged seed, or seed known to be of low vigour and poor quality, may result in reduced germination and/or reduction of seed and seedling vigour.

How it Works:

The active ingredient thiamethoxam is a systemic insecticide from the neonicotinoid chemical class. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493. The active ingredient difenoconazole is a triazole fungicide with broad-spectrum systemic activity. The active ingredient metalaxyl-M is an acylalanine fungicide with systemic activity against diseases caused by the Oomycetes class, including *Pythium* damping off. The active ingredient fludioxonil is a phenylpyrrole chemistry and has contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 492.

Labelling: Treated seed must be labelled "This seed has been treated with *Helix Vibrance* which contains insecticide (thiamethoxam) and fungicides (difenoconazole, metalaxyl-M and S-isomer, fludioxonil, and sedaxane). Wear long-sleeve shirt, long pants, and chemical-resistant gloves when handling treated seed. Do not use for food, feed or oil processing. Store away from food and feed.

Grazing: DO NOT graze or feed livestock on treated areas.

Re-cropping: DO NOT plant any crop other than those on the *Helix Vibrance* or *Vibrance 500FS* labels within 60 days to fields in which seed treated with *Helix Vibrance* were planted.

Storage: Store in a well-ventilated, secure area. Store away from food and feed. Ideal storage temperature is above freezing and below 30°C. Repeated freeze-thawing will not affect the physical integrity of the product. If the product should freeze, bring the product back to room temperature and ensure the contents are mixed well prior to application. Lab and field studies have shown that *Helix Vibrance* treated canola and mustard can be safely stored for 18 months without loss in germination or insect and disease performance. However, due to seed quality and seed storage conditions beyond the control of Syngenta Canada Inc., no claims are made to guarantee the germination of carry-over seed or propagating materials for all crop seed.

Environment: TOXIC to bees, aquatic organisms, birds, and small mammals. Bees can be exposed to product residues in flowers, leaves, pollen and/or nectar resulting from seed treatment applications. Any spilled or exposed seeds must be incorporated into the soil or cleaned up. DO NOT apply directly to water, or to areas where surface water is present. In cleaning of equipment or disposing of wastes, DO NOT contaminate water used for human or animal consumption or by wildlife and aquatic life or for irrigation purposes. If treated seed is spilled out- doors, promptly clean up.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Imidacloprid

Insecticide Group – 4A
(Refer to page 493)

Admire SPT / Alias 240 SC / Sombrero 600 FS / Stress shield 600

Company:

Bayer CropScience (*Admire SPT* – PCP#27702)

ADAMA Canada (*Alias 240 SC* - PCP#28475 and *Sombrero 600FS* – PCP#30505)

Bayer CropScience (*Stress Shield 600* – PCP#30668)

Formulation:

Admire and *Alias:* 240 g per L imidacloprid. Container sizes - 1 L, 3.78 L. Contains insecticide only.

Sombrero 600 FS and *Stress Shield 600:* 600 g per L imidacloprid. Contains insecticide only.

Crops and Insects:

Product:	Crop:	Rate:	Insects Controlled:
Admire and *Alias*	Potato	26 to 39 ml per 100 kg of potato seed tubers. The higher rate is recommended when extended length of control is needed. DO NOT apply more than 0.47 L per acre per year.	Colorado potato beetle, potato flea beetle, potato leafhopper and aphids (including green peach, buckthorn, foxglove and potato aphid)
Alias	Wheat (durum, spring, winter), barley, and oats	42 to 125 mL per 100 kg seed	Wireworm
	Soybean	260 to 520 mL per 100 kg	Soybean aphid, wireworm, and seed corn maggot.
Sombrero 600 FS	Canola, mustard (condiment-type only) and rapeseed	667 ml per 100 kg seed to 1333 mL per 100 kg seed.	Flea beetles
	Corn	21.3 mL product per 80,000 seeds.	Wireworm
	Wheat (durum, spring, winter), barley, oats	17 to 50 ml per 100 kg of seed	Wireworm
Sombrero 600	Soybean	104 to 208 ml per 100 kg of seed	Soybean aphid, seedcorn maggot and wireworm

Continued...

Crops and Insects *continued*:

Product:	Crop:	Rate:	Insects Controlled:
Stress shield 600[1]	Wheat, barley, oat[2]	17 to 50 mL per 100 kg seed	Wireworm
	Bean	104 mL per 100 kg seed	Potato leafhopper, wireworm
	Soybean[3]	104 to 208 mL per 100 kg seed	Soybean aphid, seedcorn maggot, wireworm
	Field pea	104 mL per 100 kg seed	Wireworm
		104 to 208 mL per 100 kg seed	Pea leaf weevil
	Faba bean	104 mL per 100 kg seed	Pea leaf weevil, wireworm
	Chickpea, lentil	104 mL per 100 kg seed	Wireworm

[1] DO NOT apply any subsequent applications of Group 4 Insecticide (i.e. in-furrow or foliar application) following treatment with *Stress Shield 600.*

[2] For fields with a history of moderate to high wireworm pressure, treat crops 34 to 50 mL per 100 kg seed. Use the higher rate when infestation pressures are expected to be heavy.

[3] Use the higher rate for earlier seeding, when insect populations are expected to be high, or for extended control period of aphids

Application Information:

May be applied when potato pieces are being cut. Apply specified dosage as a diluted spray onto seed-pieces using a shielded spray system that is well contained and will prevent the loss of any liquid. DO NOT dilute with any more than 3 parts water to 1 part *Admire SPT/ Alias 240 SC*. DO NOT dilute *Sombrero* beyond 6%. Agitate or stir spray solution as needed. Complete coverage of the seed piece is required for optimal insect control. As part of the seed cutting and treating process, application of a fungicide registered for potato seed treatment or an inert absorbent ingredient is recommended. Apply *Stress Shield* through a slurry applicator seed treater for uniform seed coverage. Allow seeds to dry before bagging or storing in bulk containers.

NOTE: A colourant must be added to *Sombrero* and *Stress Shield* to colour seed in accordance with the Pest Control Products Act and the Seeds Act Regulations. A blue colourant must be added when this product is applied to an oilseed.

How it Works:

Imidacloprid is a chloronicotinyl insecticide with systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493.

Tank Mixes:

Stress Shield is registered for tank mix with the fungicide seed treatments *Raxil MD,* or *EverGol Energy* in cereals. *Trilex AL, Allegiance, EverGol Energy, Apron Maxx RFC,* or *Apron Maxx RTA* in pulses.

Follow the label directions for each product and use the most restrictive precautions and limitations for either product.

BayerCropscience also supports the tank-mix of *Trilex EverGol* with *Stress Shield 600.* Apply mixes according to the most restrictive use limitation.

Alias may be tank mixed with *Raxil MD* (300 mL per 100 kg seed) for control of certain seed and soil-borne pathogens in wheat, barley, and oat. *Alias* may be tank mixed with *Apron Maxx RTA* (325 mL per 100 kg seed) or *Apron Maxx RFC* (100 mL per 100 kg seed) for control of certain seed and soil-borne pathogens in soybeans.

Restrictions:

Resistance management: Refer to page 492.

NOTE: When using a seed flow lubricant for planting corn and soybean seed treated with neonicotinoid insecticides (containing the active ingredients clothianidin, imidacloprid or thiamethoxam), **use *only* a dust-reducing fluency agent.** Talc and graphite are not permitted.

Labelling: All bags containing *Sombrero/ Stress Shield* -treated seed must be labeled or tagged as followed: "This seed has been treated with *Sombrero 600FS/ Stress Shield 600,* which contains imidacloprid. Do not use for feed, food, or oil processing. Store away from feeds and other foodstuffs"."

Grazing: Cover crops that are used as a rotational crop without a plant-back interval following treatment should not be grazed or harvested for food or feed. Do not graze or feed livestock on areas treated with *Sombrero* and *Stress Shield* for four weeks after planting. Mustard greens grown or harvested from *Sombrero*-treated seed must not be used for human consumption.

Re-cropping: Use a minimum plant-back interval of 30 days for cereals, 9 months for peas and beans, and 12 months for all other food and feed crops. Green manure and other cover crops not intended for human or animal consumption do not require a plant-back interval following treatment. DO NOT graze or harvest cover crops for food or feed. It is not recommended that this product be used in fields treated with imidacloprid during the previous season. DO NOT apply any subsequent application of imidocloprid in furrow or foliar application, or any other Group 4 insecticide following *Admire SPT/ Alias 240 SC* treatment.

Storage: Store product in cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of reach of children. Carry-over of *Sombrero*-treated seed is not recommended (treated canola, rapeseed or mustard (condiment-type only) seed stored for periods in excess of 6 months may decrease at a faster rate than untreated seed). Test seed germination if stored for more than 6 months. Do not store Sombrero-treated seed above 25C or in direct sunlight. Do not store *Stress Shield* in direct sunlight or above 35° C.

Environment: DO NOT plant treated seed pieces when rainfall is forecast for the next 48 hours. DO NOT plant treated seed pieces within 15 metres of well-head or aquatic systems, including marshes, ponds, ditches, streams, lakes, etc. This product is toxic to wildlife. Keep out of lakes, streams, ponds, or other aquatic systems. DO NOT contaminate water when disposing of equipment wash waters. Leftover treated seed should be double sown around the headland, or buried away from water sources such as lakes, streams, ponds or other aquatic systems. *Stress Shield* spillage and exposed treated seeds must be incorporated into the soil or otherwise cleaned- up from the soil surface.

Hazard Rating:

▽ Caution – Poison

For an explanation of the symbols used here see page 11.

Insure Cereal

Fungicide Group – 3, 4, 11

(Refer to page 346)

Company:

BASF Canada – PCP#30685

Formulation:

17 g per L pyraclostrobin, 17 g per L triticonazole, 10 g per L metalaxyl (both R and S isomers) formulated as a liquid suspension. Container size - 2 x 9.8 L jug, 450 L Tote

Crops, Rates and Diseases:

Crop:	Rate per 100 Kg seed	Diseases Controlled:	Diseases Suppressed:
Barley	300 mL	Seed rots and pre-emergence damping-off caused by *Fusarium* spp., *Cochliobolus sativus*, and *Pythium* spp.; post-emergence damping-off caused by *Pythium* spp.; seedling blight and root rot caused by *Fusarium* spp. and *Pythium* spp.; true loose smut (*Ustilago nuda*); covered smut (*U. hordei*); false loose smut (*U. nigra*)	Seedling blight and root rot caused by *Cochliobolus sativus*
Oat	300 mL	Seed rots and pre-emergence damping-off caused by *Fusarium* spp., *Cochliobolus sativus*, and *Pythium* spp.; post-emergence damping-off caused by *Pythium* spp.; seedling blight and root rot caused by *Fusarium* spp. and *Pythium* spp.; loose smut (*Ustilago avenae*); covered smut (*U. kolleri*)	Seedling blight and root rot caused by *Cochliobolus sativus*
Wheat, rye, triticale	300 mL	Seed rots and pre-emergence damping-off caused by *Fusarium* spp., *Cochliobolus sativus*, and *Pythium* spp.; post-emergence damping-off caused by *Pythium* spp.; seedling blight and root rot caused by *Fusarium* spp. and *Pythium* spp.; loose smut (*Ustilago tritici*); common bunt (*Tilletia tritici, T. lavies*)	Seedling blight and root rot caused by *Cochliobolus sativus*

Application Information:

Insure Cereal is a ready to use seed treatment formulation. This product is for use in commercial seed plant, in on-farm standard gravity flow or mist type treatment machines, and in on-the-go air seeder treatment systems. Agitate or shake well prior to usage. Uneven seed coverage may result in poor levels of disease control. Seed should be well conditioned and cleaned prior to treating. Treated seed should not require drying after treatment.

How it Works:

The active ingredient pyraclostrobin is a strobilurin fungicide with broad spectrum contact and systemic activity. The active ingredient triticonazole is a triazole fungicide that provides systemic broad spectrum activity. The active ingredient metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labeled "This seed has been treated with *Insure Cereal* containing fungicides pyraclostrobin, triticonazole and metalaxyl. Workers handling or planting treated seed must wear long-sleeved shirt, long pants, chemical-resistant gloves, shoes and socks, and respiratory protection (i.e. NIOSH/MSHA/BHSE approved respirator or fresh air hood). Respiratory protection is not required when workers are in a closed cab tractor. A closed cab is a chemical resistant barrier that completely surrounds the occupant of the cab and prevents contact with the pesticide or treated surfaces outside the cab. DO NOT use for food, feed or oil processing. Store away from feed or food stuff. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface."

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store in original containers with lid tightly closed. Store away from children, animals, feed stuffs, fertilizers and seed. Protect from frost and freezing. DO NOT store treated seed for more than 18 months. Store treated seed in cool, dry conditions.

Environment: Ensure proper soil incorporation of the seeds. DO NOT feed treated seed to, or otherwise expose, wildlife or domestic birds. DO NOT contaminate domestic or irrigation water supplies, lakes, streams, ponds or any body of water with the chemical, used containers, treated seed or bags. DO NOT contaminate water by cleaning of equipment or disposal of wastes.

Hazard Rating:

☠ Caution – Poison

⚠ Caution – Eye irritant and potential skin sensitizer

For an explanation of the symbols used here see page 11.

Intego SOLO Fungicide

Fungicide Group – 22
(Refer to page 346)

Company:

Valent Canada Inc. distributed by Nufarm Agriculture (PCP#31324)

Formulation:

383 g per L ethaboxam formulated as a suspension.
Container size – 3.78 L

Crops, Rates and Diseases:

Crop:	Rate per 100 kg seed	Diseases Controlled:	Diseases Suppressed:
Barley, oats , rye, triticale, wheat, buckwheat, millet (pearl, proso)	13 to 17 mL	Seed rot / pre-emergence damping-off caused by *Pythium* spp.	-
Corn (sweet, field, popcorn)	13 to 19.6 mL	Seed rot / pre-emergence damping-off caused by *Pythium* spp.	-
Dry bean, faba bean, chickpea, lentil, soybean	19.6 mL	Seed rot / pre-emergence damping-off caused by *Pythium* spp.	Early-season root rot caused by *Phytophthora sojae* and / or *Aphanomyces euteiches*
Canola, rapeseed, Ethiopian mustard (Brassica carinata), flax, mustard (all types), camelina, borage	13 to 19.6 mL	Seed rot / pre-emergence damping off caused by *Pythium* spp.	-

Application Information:

For use with closed transfer commercial seed treaters (facilities and mobile treaters). Closed transfer includes closed mixing, loading, calibrating, and closed treatment equipment. Also for use in on-farm treatment of cereal grains (except corn) and pulse crops only with open or closed transfer equipment. This product contains no colourant. An appropriate colourant must be added when the product is applied to the seed.

How it Works:

The active ingredient ethaboxam is a benzamide fungicide with activity against diseases caused by oomycetes. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Valent Canada supports the following seed treatment mixes that are not on the Intego SOLO label. Apply mixes according to the most restrictive use limitations for either product: *NipsIt SUITE, VitaFlo 280, Apron Advance, Apron Maxx, Cruiser Maxx Beans, Cruiser Maxx Pulses, Vibrance 500FS, Vibrance Maxx RTA.*

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labeled "This seed has been treated with a product containing the active ingredient ethaboxam. Do not use treated seed for feed, food or oil processing. Store away from feeds and other foodstuffs. Wear long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. This product is toxic to aquatic invertebrates, oysters and shrimp. Dispose of all excess treated seed. Left over treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. Dispose of seed packaging in accordance with local requirements. Cover or incorporate spilled treated seeds."

Grazing: DO NOT graze field pea or soybean fields grown from treated seeds, or feed field pea or soybean forage or hay from such fields to livestock.

Re-cropping: No restrictions listed.

Storage: To prevent contamination store this product away from food or feed. Store in a cool place. DO NOT store in direct sunlight. Protect from freezing temperatures.

Environment: Toxic to aquatic organisms.

Hazard Rating:

None listed.

Mancozeb

Potato ST 16 / Solan MZ / Tuberseal

Fungicide Group – M3
(Refer to page 346)

Company:

Norac Concepts Inc. (*Solan MZ* – PCP#29377, *Tuberseal* – PCP#17042)

Wilbur-Ellis Co., distributed by Loveland Products Canada (*Potato ST 16* – PCP#24734)

Formulation:

16% mancozeb formulated as a powder. Container size - 10 kg (*Tuberseal*); 20 kg (*Solan MZ* and *Potato ST 16*).

Crops and Disease:

Control of *Fusarium* seed piece decay in potatoes.

Rates:

500 g per 100 kg seed.

Application Information:

Apply product before planting; thoroughly coat surface of whole or cut seed with dust. If treated whole seed is cut, make a second application to protect cut surfaces. Plant as soon as possible after treating. If cut seed is not planted within two days of treating, store in a ventilated location to allow cut surfaces to dry.

How it Works:

The active ingredient mancozeb is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed pieces should be labelled "Poisonous to man and animals. This seed has been treated with mancozeb for the control of fusarium decay. Do not use for food or feed purposes."

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store product in a cool, dry, well-ventilated place. Keep away from fire and sparks.

Environment: DO NOT contaminate feed or food. DO NOT contaminate any body of water.

Hazard Rating:

None listed.

Maxim D/Maxim PSP/ Maxim MZ PSP

Fungicide Group –
Maxim D – 12, 3
Maxim PSP - 12
Maxim MZ PSP - 12, M3
(Refer to page 346)

Company:

Syngenta Canada (*Maxim D* – PCP #30599; *Maxim PSP* – PCP#26647; *Maxim MZ PSP* – PCP#27965)

Formulation:

Maxim D: 19.4 g per L fludioxonil and 19.4 g per L difenconazole formulated as a suspension.

***Maxim PSP*:** 0.5% fludioxonil formulated as a dry powder. Container size 10 kg.

***Maxim MZ PSP*:** 0.5% fludioxonil plus 5.7% mancozeb formulated as a dry powder. Container size - 10 kg, 20 kg, 22.7 kg.

Crops and Diseases Controlled:

Seed piece treatment fungicide for use on potato for the control of black scurf / stem and stolon canker (*Rhizoctonia solani*), silver scurf (*Helminthosporium solani*), and fusarium dry rot (*Fusarium* spp.). These products do not control bacterial diseases present within the seed.

Rate:

Maxim D: 1130 mL per 100 kg of seed for control of black scurf / stem and stolon canker and silver scurf; 65 to 130 mL per 100 kg of seed for control of Fusarium dry rot (use the high rate when disease pressure and / or resistance pressure is high); 65 mL per 100 kg of seed for suppression of black scurf and control of stem and stolon canker (*Rhizoctonia solani*).

***Maxim PSP; Maxim MZ PSP*:** Use 500 g per 100 kg of cut seed. One 10 kg bag treats 2000 kg of seed.

Application Information:

Maxim D: Shake or mix well before using. Apply using standard seed treatment equipment that provides uniform seed coverage. Uneven or incomplete seed coverage may not give the desired level of disease control. When applying at a rate of 130 mL / 100 kg seed, *Maxim D* may be applied undiluted or as a water-based slurry. DO NOT exceed a maximum slurry volume of 260 mL per 100 kg seed. When applying at rates lower than 130 mL of *Maxim D* per 100 kg seed, add sufficient water to allow for a slurry volume of at least 130 mL per 100 kg seed. Follow manufacturer's application instructions for the seed treatment equipment used.

***Maxim PSP; Maxim MZ PSP*:** Apply using appropriate treater designed for treating potatoes or by dust attachment over belt. Cut pieces should be treated immediately after cutting. If treated seed pieces are bagged, they should be stored for 2 to 3 days in open crates before bagging. For optimum protection against silver scurf, ensure that seed tubers are completely free of soil. Total skin coverage is essential.

How it Works:

Fludioxonil is a phenylpyrrole fungicide with contact activity. Mancozeb is a dithiocarbamate fungicide with contact activity. The active ingredient difenoconazole is a triazole fungicide with broad-spectrum systemic activity. For more information refer to "Fungicide Modes of Action" on page 345

Tank Mixes:

None listed.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Ideal storage temperature for the product is above freezing and below 30°C. Store in a dry place. Avoid contamination of feed.

Environment: This product is toxic to fish and aquatic invertebrates. DO NOT apply directly to water, or to areas where surface water is present. In cleaning of equipment or disposing of wastes, DO NOT contaminate water used for human or animal consumption or by wildlife and aquatic life or for irrigation purposes.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Other precautions: Keep out of reach of children. May be harmful if swallowed. Avoid inhalation of dust, vapour and / or spray mist. Wash hands and face after handling and before eating or smoking. Avoid contamination of feed and foodstuffs. Treated seed must not be used for food, feed or oil processing. Treat seed in a well-ventilated area. When handling, contaminated equipment or treated seed, wear long-sleeved coveralls over long pants and long-sleeved shirt and chemical-resistant gloves plus goggles.

Maxim Quattro

Fungicide Group – 1, 4, 11, 12

(Refer to page 346)

Available to commercial seed treaters only.

Company:

Syngenta Canada – PCP#29871

Formulation:

26.5% thiabendazole, 3.32% fludioxonil, 2.65% metalaxyl-M and S-isomer, 1.33% azoxystrobin formulated as a liquid suspension seed treatment.

Container size - 5 L to Bulk.

Crops and Diseases:

Control of seed- and soil-borne *Pythium*, *Rhizoctonia*, and *Fusarium* (including *F. graminearum* and *F. verticillioides*) and weakly pathogenic *Aspergillus* and *Penicillium* causing seed rot / pre-emergence damping-off, post-emergence damping-off, and seedling blight on corn.

Rate:

67 mL per 100 kg seed.

Application Information:

For use by a commercial seed treater only. Mix with water to form a slurry seed treatment. Contains no colourant; an appropriate colourant must be added to slurry before treating seed. Maintain constant agitation of slurry. Allow seed to dry before bagging. Treatment of highly mechanically damaged, poor quality or low vigour seed may result in reduced germination and / or reduced seed and seedling vigour. If seed lot quality is unknown conduct a germination test prior to treatin.

How it Works:

The active ingredient thiabendazole is a benzimidazole fungicide with contact and systemic activity. The active ingredient fludioxonil is a phenylpyrrole fungicide with contact activity. The active ingredient metalaxyl-M is an acylalanine fungicide with systemic activity against diseases caused by the Oomycetes class, including Pythium damping off. The active ingredient azoxystrobin is a methoxyacrylate (strobilurin) fungicide with broad spectrum activity to be used as a preventative and curative fungicide. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled "This seed has been treated with thiabendazole, fludioxonil, metalaxy-M and S-isomer, and azoxystrobin. Use chemical resistant-gloves when handling treated seed. DO NOT use for food, feed or oil processing. Store away from feed and foodstuffs. DO NOT graze corn or cut for forage within 30 days of planting."

Grazing: DO NOT graze or feed livestock on treated areas within 30 days of planting.

Re-cropping: No restrictions listed.

Storage: Store product between 0°C and 30°C. Repeated freeze-thawing of the product will not compromise its integrity. If the product should freeze, bring the product back to room temperature and ensure thorough mixing before use. Store away from food and feed.

Environment: DO NOT apply directly to water, or to areas where surface water is present. In cleaning of equipment or disposing of wastes, DO NOT contaminate water used for human or animal consumption or by wildlife and aquatic life or for irrigation purposes. If treated seed is spilled outdoors, promptly clean up.

Hazard Rating:

⚠ Caution – Potential skin sensitizer

For an explanation of the symbols used here see page 11.

Mertect SC

Fungicide Group – 1

(Refer to page 346)

Company:

Syngenta Canada – PCP#13975

Formulation:

500 g per L thiabendazole formulated as a water dispersible suspension. Container size - 4 x 5 L.

Crops and Diseases:

Post-harvest control of storage rots caused by *Fusarium, Phoma, Helminthosporium, Oospora* and *Rhizoctonia* spp. on potato.

Rate and Water Volume:

7.5 L per 170 L of water. Spray 2 L of this suspension per 1 metric tonne of potatoes.

Application Information:

Post-harvest treatment. Shake well before using. DO NOT allow suspension to stand without continuous agitation. Potatoes must rotate along conveyor line to ensure complete coverage. Prior to treating potatoes destined for export, confirm with authorities that treated potatoes will be allowed to enter importing country.

How it Works:

The active ingredient thiabendazole is a benzimidazole fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Minimum storage temperature 0°C.

Environment: Toxic to aquatic organisms. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Do not discharge effluent containing this product into sewer systems, lake, streams, ponds, estuaries, oceans, and other waters.

Hazard Rating:

None listed.

Metalaxyl

Fungicide Group – 4
(Refer to page 346)

Allegiance FL/Belmont 2.7FS

Company:

Bayer CropScience (*Allegiance FL*– PCP#26674)
Platform Specialty Products (*Belmont 2.7 FS* – PCP#30246)

Formulation:

317 g per L metalaxyl formulated as a liquid seed treatment.
Allegiance FL container size - 4 X 3.79 L.
Belmont 2.7 FS container size – 500 mL, 10 L and 200 L.

Crops, Diseases and Rates (for crops processed in Canada):

Crop	Disease Controlled:	Application Rates* (per 100 kg seed treated):	Water Volume (required to make up a total volume of 500 mL):
Chickpea, dry pea	Seed rots and seedling blights caused by *Pythium* spp.	16 to 110 mL	484 to 390 mL
Canola (rapeseed)	Seed rots and seedling blights caused by *Pythium* spp.	32 to 110 mL	468 to 390 mL
Alfalfa, bean, clover, corn, sainfoin, vetch	Seed rots and seedling blights caused by *Pythium* spp.	46 to 110 mL	454 to 390 mL
Grasses (forage)	Seed rots and seedling blights caused by *Pythium* spp.	46 to 93 mL	454 to 407 mL
Grasses (turf)	Seed rots and seedling blights caused by *Pythium* spp.	93 mL	407 mL
Soybean	Seed rots and seedling blights caused by *Pythium* spp., early season *Phytophthora*	46 to 93 mL	454 to 407 mL
Sunflower	Seed rots and seedling blights caused by *Pythium* spp., downy mildew	110 to 189 mL**	390 to 311 mL
Low tannin lentil***	Seed rots and seedling blights caused by *Pythium* spp.	16 mL	484 mL

* Use the high rate if planting into cold, wet soils, if the seed is of poor quality, or if disease pressure is expected to be high.

** High rate is for downy mildew control.

*** For use on low tannin lentils destined export or seed production only.

Crops, Diseases and Rates (for crops processed in Canada) *continued*:

Crop	Diseases Controlled:	Application Rates* (per 100 kg seed treated):	Water Volume (required to make up a total volume of 500 to 620 mL):
Corn	Seed rots and seedling blights caused by *Pythium* spp.; downy mildew (*Sclerophthora macrospora*)	189 to 620 mL	311 to 0 mL
Pea	Seed rots and seedling blights caused by *Pythium* spp.; downy mildew (*Peronospora viciae*)	146 mL	354 mL
Sunflower	Seed rots and seedling blights caused by *Pythium* spp.; downy mildew (*Plasmopora halstedii*)	620 mL	0 mL
Wheat, barley, oats, rye, triticale (*Belmont* only)	Seed rots and seedling blights caused by *Pythium* spp.	46 to 110 mL	454 to 390 mL
Sorghum	Seed rots and seedling blights caused by *Pythium* spp.	93 to 110 mL	407 to 390 mL
	Downy mildew (*Perenosclerospora sorghi*)	189 mL	311 mL
Bird's-foot trefoil	Seed rots and seedling blights caused by *Pythium* spp.	46 to 110 mL	454 to 390 mL
Low-tannin lentil	Seed rots and seedling blights caused by *Pythium* spp.	16 mL	484 mL

* Use the high rate if planting into cold, wet soils, if the seed is of poor quality, or if disease pressure is expected to be high.

Application Information:

Mix with water to form a slurry seed treatment. Contains no colourant; an appropriate colourant must be added to slurry before treating seed. Maintain constant agitation of slurry. Allow seed to dry before bagging. Treatment of highly mechanically damaged, poor quality or low vigour seed may result in reduced germination and/or reduced seed and seedling vigour. If seed lot quality is unknown conduct a germination test prior to treating.

How it Works:

The active ingredient metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled as follows; "This seed has been treated with *Allegiance FL* or *Belmont 2.7 FS* seed protectant which contains metalaxyl. DO NOT use for feed, food or oil processing." All bags containing seed for export must be labelled "FOR EXPORT ONLY."

Grazing: DO NOT graze or feed livestock on treated areas for 4 weeks after planting.

Re-cropping: No restrictions listed.

Storage: DO NOT store above 35°C or below 0°C. Store in original container, away from pesticides, food or feed.

Environment: Treated seed may be toxic to birds and other wildlife. Clean up any spilled seeds and ensure seed is properly incorporated at planting.

Hazard Rating:

⚠ Warning – Skin and eye irritant

For an explanation of the symbols used here see page 11.

NipsIt INSIDE 600 Insecticide

Insecticide Group – 4
(Refer to page 493)

Company:

Valent Canada Inc. distributed by Nufarm Agriculture (PCP# 28975)

Formulation:

600 g per L clothianidin formulated as a suspension.

Container size – 3.78 L

Crops, Rates and Diseases:

Crop:	Rate per 100 kg seed	Insects:
Canola, rapeseed, Ethiopian mustard (*Brassica carinata*)	250 to 666 mL*	Flea beetle
Wheat	17 to 100 mL**	Wireworm
Potato	20.8 mL	Wireworm
	10.4 to 20.8 mL***	Aphid, colorado potato beetle, potato leafhopper, potato flea beetle
Corn	33.3 to 66.6 mL	Seedcorn maggot, wireworm

* Use rate of 250 mL per 100 kg of seed for low to moderate flea beetle pressure, 333 mL per 100 kg of seed for higher level of control under moderate flea beetle pressure, and 666 mL per 100 kg of seed under high to extreme flea beetle pressure where extended control is required.

** Rate of 17 mL per 100 kg of seed provides wireworm suppression only. Use higher rates of 33 to 100 mL per 100 kg of seed on wheat seed to be planted into fields known to have a history of severe wireworm infestations.

*** For extended residual control of potato pests other than wireworm, apply the higher rate.

Application Information:

Canola, rapeseed, Ethiopian mustard (*Brassica carinata*), corn: For use with commercial seed treaters (facilities and mobile treaters) with closed transfer including closed mixing, loading, calibrating and closed treatment equipment only. No open transfer of *Nipsit Inside 600 Insecticide*.

Wheat: For use in commercial seed treatment facilities (with closed transfer including closed mixing, loading, calibrating, and closed treatment equipment only) and for use on-farm (open transfer including open mixing, loading, calibrating, and open treatment equipment is allowed).

This product contains no colourant. An appropriate colourant must be added when this product is applied.

How it Works:

The active ingredient clothianidin is a chloronicotinyl insecticide with systemic activity. For more information refer "Insecticide Groups Based on Modes of Action" on page 493.

Tank Mixes:

Valent Canada supports the following seed treatment mixes that are not on the *NipsIt INSIDE 600* label. Apply mixes according to the most restrictive use limitations for either product:

Wheat – *NipsIt SUITE Cereals* for enhanced wireworm protection

Restrictions:

Resistance management: Refer to page 492. DO NOT apply any subsequent application of a Group 4 insecticide (in-furrow or foliar) in canola, rapeseed, carinata, wheat, or corn following treatment with *NipsIt Inside 600 Insecticide*.

NOTE: When using a seed flow lubricant for planting corn and soybean seed treated with neonicotinoid insecticides (containing the active ingredients clothianidin, imidacloprid or thiamethoxam), use only a dust-reducing fluency agent. Talc and graphite are not permitted.

Labelling: Treated seed must be labeled "This seed was treated with a product containing the active ingredient clothianidin. Do not use for feed, food or oil processing. Rape greens and seed grown or harvested from *NipsIt Inside 600 Insecticide*-treated seed must not be used for feed or human consumption. Store away from feeds and other foodstuffs. Wear long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. This product is toxic to aquatic invertebrates. Dispose of all excess treated seed. Left over treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. Dispose of seed packaging in accordance with local requirements. Cover or incorporate spilled treated seeds. Planters must use a closed cab planter when planting treated wheat seeds."

Grazing: No restrictions listed.

Re-cropping: Registered crops and potatoes may be replanted at any time. A 30-day plant-back interval on cereal grains (except wheat), grasses, non-grass animal feeds, soybeans and dry beans is required.

Storage: Store in a cool place. DO NOT store in direct sunlight. Protect from freezing temperatures.

Environment: Clothianidin is toxic to bees. Dust generated during planting of treated seed may be harmful to bees and other pollinators. When using a seed flow lubricant with this treated seed, only a dust reducing fluency agent is permitted. Talc and graphite are not permitted to be used as a seed flow lubricant for corn seed treated with these insecticides. Carefully follow use directions for this seed flow lubricant. DO NOT load or clean planting equipment near bee colonies, and avoid places where bees may be foraging, such as flowering crops or weeds. When turning on the planter, avoid engaging the system where emitted dust may contact honey bee colonies. Spilled or exposed seeds and dust must be incorporated into the soil or cleaned up from the soil surface. Bees can be exposed to product residues in flower, leaves, pollen and/or nectar resulting from seed treatments. Toxic to aquatic organisms. Treated seed is toxic to birds and small wild mammals. The use of this chemical may results in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth of the water table is shallow. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

NipsIt SUITE Cereals of Seed Protectant

Fungicide Group – 3, 4
Insecticide Group – 4
(Refer to pages 346 and 493)

Company:

Valent Canada Inc. distributed by Nufarm Agriculture (PCP#28975)

Formulation:

600 g per L clothianidin formulated as a suspension.

Container size – 3.78 L

Crops, Rates, Diseases, and Insects:

Crop:	Rate per 100 kg seed	Diseases Controlled:	Diseases Suppressed:	Insects Suppressed:
Wheat	326 mL	Early season seed rot/pre-emergence damping-off caused by *Fusarium* spp. and *Rhizoctonia solani*, early season seed rot/pre-emergence damping-off, post-emergence damping-off, seedling blight and seedling root rot caused by *Pythium* spp., common bunt (*Tilletia laevis*), loose smut (*Ustilago tritici*)	Common root rot (*Cochliobolus sativus*)	**Wireworm.** Under moderate to high wireworm pressure or in situations where control is required a tank mix with *NipsIt INSIDE.*

Application Information:

For use in commercial seed treatment facilities (with closed transfer including closed mixing, loading, calibrating, and closed treatment equipment only) and for use on-farm (open transfer including open mixing, loading, calibrating, and open treatment equipment is allowed).

How it Works:

The active ingredient clothianidin is a chloronicotinyl insecticide with systemic activity. For more information refer "Insecticide Groups Based on Modes of Action" on page 493.

The active ingredient metalaxyl is an acylalanine fungicide with systemic activity against diseases caused by oomycetes, including *Pythium* damping-off. Metconazole is a broad-spectrum triazole demethylation inhibitor (DMI) fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Valent Canada supports the following seed treatment mixes that are not on the *NipsIt SUITE Cereals* label. Apply mixes according to the most restrictive use limitations for either product:

NipsIt INSIDE 600 at rates of 17-83 mL per 100 kg of seed.

Intego SOLO for control of metalaxyl resistant populations of *Pythium* spp.

Restrictions:

Resistance management: Refer to page 344 and 492. DO NOT apply any subsequent application of a Group 4 insecticide (in-furrow or foliar) following treatment with *NipsIt SUITE Cereals OF Seed Protectant.*

Labelling: Treated seed must be labeled "This seed was treated with *NipsIt SUITE Cereals OF Seed Protectant*, which contains clothianidin, metalaxyl, and metconazole. Do not use treated seed for feed, food or oil processing. Store away from feeds and other foodstuffs. Wear long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. This product is toxic to aquatic invertebrates. Dispose of all excess treated seed. Left over treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. Cover or incorporate spilled treated seeds. A closed cab planter is required when planting treated wheat seeds."

Grazing: DO NOT graze or feed livestock on treated areas for four weeks after planting.

Re-cropping: Corn, canola, rapeseed, and wheat may be replanted at any time. A 35-day plant-back interval on cereal grains (except wheat), grasses, non-grass animal feeds, potato, soybeans and dry beans is required.

Storage: Store in a cool place. DO NOT store in direct sunlight. Protect from freezing temperatures.

Environment: Toxic to aquatic organisms. Treated seed is toxic to birds and small wild animals. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface. Toxic to bees. Bees can be exposed to product residues in flowers, leaves, pollen and/or nectar resulting from seed treatments. The use of this product in areas where soils are permeable, particularly where the water table is shallow, may result in ground water contamination. DO NOT use to control aquatic pests. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

None listed.

Phosphorous acid

Fungicide Group – 33
(Refer to page 346)

Confine / Confine Extra / Rampart

Company:

Winfield Solutions (*Confine* – PCP#29100, *Confine Extra* – PCP#30648)

Loveland Products Canada (*Rampart*– PCP#30654)

Formulation:

Confine: 45.8% mono and di-potassium salts of phosphorous acid

Confine Extra, Rampart: 53% mono and di-potassium salts of phosphorous acid

Container sizes - 9.46 L - 946.35 L (*Confine, Confine Extra*); 9.46 L (*Rampart*).

Crops, Diseases and Rates:

Confine, Confine Extra: Post-harvest treatment of potatoes for the suppression of late blight (*Phytophthora infestans*), pink rot (*Phytophthora erythroseptica*), and silver scurf (*Helminthosporium solani*) storage infection.

Rampart: Post-harvest treatment of potatoes for control of late blight (*Phytophthora infestans*) and pink rot (*Phytophthora erythroseptica*).

Rate and Application Information:

For application prior to storage:
Dilute *Confine* at a 1:4.3 ratio with water (377 mL *Confine* + 1623 mL water). Apply 2 L of solution as a spray to 1000 kg of poratoes.

Dilute *Confine Extra* at a 1:5.13 ratio with water (326 mL *Confine Extra* + 1674 mL water). Apply 2 L of solution as a spray to 1000 kg of potatoes.

Dilute *Rampart* at a 1:5.26 ratio with water (190 mL *Rampart* + 1 L water). Apply 2 L of solution per 100 kg of harvested potatoes as a spray or rinse.

For application to stored potatoes (Rampart only):
Dilute *Rampart* at a 1:5.26 ratio with water (190mL *Rampart* + 1 L water). Apply 2 L of solution per 100 kg of stored potatoes into water used for post-harvest storage.

How it Works:

The active ingredient mono- and di-potassium salts of phosphorous acid is a phosphonate fungicide with systemic activity to suppress pathogen inoculum. To be used as a preventative fungicide application on harvested tubers. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store this product away from food or feed.

Environment: DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of waste. DO NOT apply by air.

Hazard Ratings:

None listed.

Proseed

Fungicide Group – 12
(Refer to page 346)

***Proseed* is available to commercial seed treaters only**

Company:

Syngenta Canada – PCP# 29814

Formulation:

40.3% fludioxonil formulated as a seed treatment solution. Container size - 1 L to bulk.

Crops and Diseases:

Protection of wheat, barley, oat, rye, corn, triticale, sorghum, and buckwheat seed and seedlings from seed- and soil-borne fungi which cause seed decay, damping-off, and seedling blights including *Fusarium* spp. and *Rhizoctonia* spp.

Rate:

5.2 to 10.4 ml per 100 kg of seed.

Note: use higher rates for crop/cultivars that are more susceptible to pathogens or when higher disease pressure is expected.

Application Information:

For use in commercial seed treatments facilities only. Apply as a water-based slurry using standardized equipment to ensure uniform seed coverage. Maintain constant agitation of the slurry during treatment. Allow seed to dry before bagging. This product contains no colourant. A red colourant must be added when this product is applied to grain.

How it Works:

Fludioxonil is a phenypyrolle fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Proseed may be mixed with *Apron XL* seed treatment for control of diseases caused by *Pythium* spp. and *Phytophthora* spp. provided *Apron XL* is registered on that crop.

Follow the label directions for each product and use the most restrictive precautions and limitations for either product.

Restrictions:

Resistance management: Refer to page 344.

Labelling: All bags containing treated seed for sale or use in Canada must be labelled or tagged as follows: "This seed has been treated with fludioxonil fungicide (or fludioxonil and metalaxyl-M fungicide if appropriate). DO NOT use for feed, food or oil purposes. Store away from feeds and foodstuffs. DO NOT graze treated crops, or cut for forage, within 30 days of planting."

Grazing: DO NOT graze or feed livestock on treated areas for 30 days after planting.

Re-cropping: No restrictions listed.

Storage: Store in temperatures above freezing and below 30°C.

Environment: This product is toxic to fish and other aquatic organisms. DO NOT apply this product directly to water, or to areas where surface water is present. In cleaning of equipment or disposing of wastes, do not contaminate water used for human or animal consumption, or by wildlife and aquatic life, or for irrigation purposes.

Hazard Ratings:

None listed.

Prosper EverGol/ Prosper FX/ Poncho 600 FS/Titan

**Fungicide Group –
Prosper EverGol/
Prosper FX - 4,7,11
Insecticide Group – 4**
(Refer to page 346 and 493)

***Prosper EverGol, Prosper FX* and *Poncho 600 FS* available to commercial seed treaters only. *Titan* is available for on-farm seed treatment. *Poncho 600 FS* and *Titan* contain insecticide only.**

Company:

Bayer CropScience (*Prosper Evergol* – PCP#30363; *Prosper FX* – PCP#29159; *Poncho 600 FS* – PCP#27453; and *Titan 600 FS* – PCP#27449)

Formulation:

Active ingredient:	**Active ingredient strength (g per L):**			
	Prosper Evergol	***Prosper FX***	***Poncho 600 FS***	***Titan ST***
Container sizes:	3.8L to 1000L, bulk	56.8L, 100L, 1000L, bulk	1L, 3.8L, 100L, 113L, 200L, 1000L	1L, 3.8L, 10L, 200L, 1000L
Clothianidin	290	285.7	600	600
Carbathiin	-	50	–	–
Penflufen	10.7	–	–	–
Trifloxystrobin	7.15	7.14	–	–
Metalaxyl	7.15	5.36	–	–

Crops, Insects, Diseases and Rates:

Product:	**Crop:**	**Rate per 100 kg of seed:**	**Insects Controlled:**	**Diseases Controlled:**
Prosper Evergol	Canola, rapeseed, mustard (oilseed and condiment)	1400 mL	Flea beetles	Seed rot, damping off, seedling blight and early season root rot caused by *Pythium, Rhizoctonia, Fusarium,* and seed-borne *Alternaria* spp.; seed-borne blackleg (*Leptosphaeria maculans*).
Prosper FX	Canola, rapeseed	1400 mL		
Poncho 600 FS	Canola, rapeseed	250, 333 or 666 mL[1]	Flea beetles	–
	Corn	33.3 to 66.6 mL of product per 80,000 units of seed (0.25 to 0.5 mg a.i. per kernel)	Wireworm; seed corn maggot	–

See footnotes on following page.

Continued...

Crops, Insects, Diseases and Rates *continued*:

Product:	Crop:	Rate per 100 kg of seed:	Insects Controlled:	Diseases Controlled:
Titan	Potatoes	20.8 mL per 100 kg potato seed pieces	Wireworms	–
		10.4 to 20.8 mL per 100 kg potato seed pieces	Aphid (potato, green peach, foxglove and buckthorn aphids), Colorado potato beetle, potato leafhopper, potato flea beetle (overwintered adults and suppression of second generation)	–

[1] Increasing rates for low, moderate and severe flea beetle pressure.

Application Information:

Prosper Evergol, Prosper FX and *Poncho 600 FS* are for use in commercial seed treatment facilities with closed transfer systems only. *Prosper FX* and *Poncho 600 FS* DO NOT contain a colourant. An appropriate colour must be added when these products are applied. Seed treatment must be thoroughly agitated to ensure uniform mixing of product prior to and during application. Treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour.

Titan ST is a seed piece treatment. Apply specified rate as a diluted spray onto seed pieces using a well contained, shielded spray system to prevent the loss of any liquid. Apply only in areas with adequate ventilation or in areas equipped to remove spray mist or dust. Agitate or stir spray solution as needed. For optimal insect control good coverage of seed pieces is required. DO NOT dilute with any more than 6 parts water to 1 part *Titan ST*. Plant seed pieces as soon as possible after cutting and treating.

How it Works:

Clothianidin is a chloronicotinyl insecticide with systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493. Carbathiin is a carboxamide fungicide with systemic activity; penflufen is a carboxamide (SDHI) fungicide with systemic activity; trifloxystrobin is a strobilurin fungicide with broad spectrum preventative activity; and metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344 and 492.

NOTE: When using a seed flow lubricant for planting corn and soybean seed treated with neonicotinoid insecticides (containing the active ingredients clothianidin, imidacloprid or thiamethoxam), **use *only* a dust-reducing fluency agent.** Talc and graphite are not permitted.

Subsequent applications: DO NOT make any subsequent application of a group 4 insecticide (in furrow or foliar application) following treatment with any of these products.

Labelling: Treated seed must be labelled as follows: "This seed has been treated with clothianidin and / or carbathiin, penflufen and metalaxyl. DO NOT use for food, feed or oil processing. Store away from feeds and other foodstuffs."

Grazing: *Prosper FX* – Do not graze or feed livestock on seeded areas for four weeks after planting.

Re-cropping: For *Prosper Evergol, Prosper FX* and *Poncho 600 FS*, corn and canola may be replanted at any time. For *Titan ST*, corn, and canola and potatoes may be replanted at any time. For all products, a 1-year plant back interval is required for leafy, root and tuber vegetables. A 30-day plant back is required for cereals, grasses, nongrass animal feeds, soybeans and dry beans.

Storage: Protect products from freezing. DO NOT contaminate water, food or feed by storage, disposal or by cleaning of equipment. Store in a cool place. DO NOT store in direct sun- light. Store away from food or feed. DO NOT store treated seed above 25°C or in direct sunlight. Treated seed stored for periods in excess of 9 months should be tested for germination before planting.

Environment: These products are toxic to aquatic invertebrates. DO NOT apply directly to water or to areas where surface water is present. DO NOT contaminate water when disposing of equipment wash waters. These products are toxic to birds and mammals. Any spilled or exposed seeds should be incorporated into the soil or otherwise cleaned up from the soil surface.

Hazard Rating:

☠ Warning – Poison

For an explanation of the symbols used here see page 11.

Rancona Apex

Fungicide Group – 3
(Refer to page 346)

Company:

Platform Specialty Products – PCP#29176

Formulation:

4.61 g per L ipconazole formulated as a suspension. Container sizes - 10 L, 200 L, 1000 L.

Crops, Diseases and Rates:

Crop:	Rate per 100 kg of seed:	Diseases Controlled:	Diseases Suppressed*:
Barley	325 mL	General seed rots (including those caused by saprophytic organisms such as *Penicillium* and *Aspergillus*); seed rot, damping off and seedling blight (seed- and soil-borne *Fusarium*); seed rot and seedling blight (seed and soil-borne *Cochliobolus sativus*); true loose smut (*Ustilago nuda*), covered smut (*U. hordei*), false loose smut (*U. nigra*), leaf stripe (*Pyrenophora graminea*)	Common root rot *(Cochliobolus sativus)* Crown and foot rot *(Fusarium spp.)*
	325 to 433 mL	True loose smut (*Ustilago nuda*) control. Use the higher rate for highly infected seed lots only.	
Wheat	325 mL	Loose smut (*Ustilago tritici*); common bunt (*Tilletia tritici, T. laevis*); seed rot and seedling blight caused by *C. sativus, Fusarium, Aspergillus*, and *Penicillium.*	
Oat	325 mL	Loose smut (*Ustilago avenae*); covered smut (*U. kolleri*); seed rot and seedling blight caused by *Fusarium, C. sativus, Aspergillus* and *Penicillium.*	
Rye	325 mL	Seed rot and seedling blight caused by *Fusarium, C. sativus, Aspergillus* and *Penicillium.*	
Triticale	325 mL	Seed rot and seedling blight caused by *Fusarium, C. sativus, Aspergillus* and *Penicillium.*	

* Suppression means consistent control at a level which is not optimal but is still of commercial benefit.

Application Information:

Rancona Apex is designed to be used undiluted in commercial seed treaters and by dripper applicators. Undiluted *Rancona Apex* can be used at temperatures down to -20°C.

How it Works:

The active ingredient ipconazole is a demethylation inhibitor with systemic and contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Rancona Apex Fungicide may be tank mixed with *Apron XL LS* and applied to wheat (spring or winter), barley, oats or rye. Apply *Rancona Apex Fungicide* at any rate recommended in the table above, and apply *Apron XL LS* at 2.7 ml/100Kg.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled as follows "This seed has been treated with *Rancona Apex* liquid seed protectant containing ipconazole. Do not use for feed, food, or oil processing."

Grazing: DO NOT graze or feed livestock on treated area for 30 days after planting.

Re-cropping: No restrictions listed.

Storage: DO NOT store in direct sunlight or above 35°C. DO NOT freeze.

Environment: DO NOT contaminate ponds, lakes or streams.

Hazard Rating:

None listed.

Rancona RS

Fungicide Group – 3, 7
(Refer to page 346)

Company:

Platform Specialty Products – PCP#30217

Formulation:

9.38 g per L ipconazole and 87.5 g per L carbathiin formulated as a liquid suspension seed treatment. Container sizes - 10 L, 1000 L.

Crops, Diseases and Rates:

Crop:	Rate per 100 kg of seed:	Diseases Controlled:	Diseases Suppressed*:
Canola, rapeseed	800 mL	Seed rot, damping off, and seedling blight caused by *Rhizoctonia*, and *Fusarium* spp. Seed-borne blackleg (*Leptosphaeria maculans*)	Root rot caused by *Rhizoctonia* and *Fusarium* spp.

Application Information:

Rancona RS is ready to use and may be applied to seed as purchased. However, dilution with water may help to achieve more uniform seed coverage when using some types of treaters and/or when treating under dry and/or hot conditions.

How it Works:

The active ingredient ipconazole is a demethylation inhibitor with systemic and contact activity and carbathiin is a carboximide fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled as follows "This seed has been treated with carbathiin and ipconazole. Do not use treated seed for feed, food, or oil processing."

Grazing: DO NOT graze or feed livestock on treated area for four weeks after planting.

Re-cropping: No restrictions listed.

Storage: Store this product away from food or feed.

Environment: DO NOT contaminate ponds, lakes or streams.

Hazard Rating:

None listed.

Raxil MD

Fungicide Group – 3, 4
(Refer to page 346)

Company:

Bayer CropScience – PCP#27692

Formulation:

5.0 g per L tebuconazole and 6.6 g per L metalaxyl formulated as a flowable seed treatment. Container size - 10 L, 200 L, 1,000 L.

Crops, Rates and Diseases:

Crop:	Undiluted Use Rate:		Diseases Controlled:	Diseases Suppressed*:
	Rate per 100 kg of Seed	**Amount of Seed per 10 L Jug**		
Wheat	300 mL	3320 kg	Loose smut (*Ustilago tritici*), common bunt or stinking smut (*Tilletia tritici, T. laevis*); seed rot and pre-emergent damping-off caused by seed- and soil-borne *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; damping-off caused by *Pythium* spp.; seed-borne *Septoria nodorum*.	Root and crown rot caused by seed- and soil-borne *Fusarium* spp.; common root rot caused by seed- and soil-borne *Cochliobolus sativus*; seed rot and pre-emergent damping-off caused by seed- and soil-borne *C. sativus*; seedling blight caused by seed-borne *C. sativus*.
Barley	300 mL	3320 kg	True loose smut (*Ustilago nuda*), covered smut (*U. hordei*), false loose smut (*U. nigra*); seed rot and pre-emergent damping-off caused by seed- and soil-borne *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; damping-off caused by *Pythium* spp.; barley leaf stripe (*Pyrenophora graminis*).	
Oat	300 mL	3320 kg	Covered smut (*Ustilago kolleri*), loose smut (*U. avenae*); seed rot and pre-emergent damping-off caused by seed- and soil-borne *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; damping-off caused by *Pythium* spp.	

* Suppression means consistent control at a level which is not optimal but is still of commercial benefit.

Application Information:

Raxil MD is a ready to use formulation designed for commercial or on-farm treatment with conventional seed treating equipment which can accurately control application rates and provide good distribution of the chemical onto the seed in the mixing chamber. Uniform application to seed is necessary to ensure seed safety and best disease control. See manufacturer's instructions supplied with the treater system for information on proper application technique.

Uniform coverage at the correct rate is important for satisfactory results. Under-treatment may lead to loss of efficacy and over-treatment could reduce germination. Seed may be planted immediately after treating.

How it Works:

The active ingredient tebuconazole is a systemic triazole fungicide with broad-spectrum activity. The active ingredient metalaxyl is an acylaline fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labelled "This seed has been treated with *Raxil MD* which contains tebuconazole and matalaxyl; DO NOT use for food, feed or oil processing."

Grazing: DO NOT graze or feed livestock on treated areas for 4 weeks after planting.

Re-cropping: No restrictions listed.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Store in a cool, dry place and avoid excessive heat.

Environment: DO NOT contaminate water, food, or feed by storage, disposal, or by cleaning of equipment.

Hazard Rating:

⚠ Danger – Skin and eye irritant

For an explanation of the symbols used here see page 11.

Raxil PRO

Fungicide Group – 3, 4

(Refer to page 346)

Company:

Bayer CropScience – PCP# 30102

Formulation:

3.0 g per L tebuconazole, 15.4 g per L prothioconazole and 6.2 g per L metalaxyl formulated as a suspension. Container sizes - 10 L, 58.5 L, 175.5 L, 1000 L.

Crops, Diseases and Rates:

Crop:	Rate per 100 kg of seed:	Diseases Controlled:	Diseases Suppressed*:
Wheat, barley, oat	325 mL	Seed rot/ pre-emergence damping-off caused by seed-borne *Fusarium* spp., *Aspergillus* spp. and *Cochliobolus sativus*; seed rot/ pre-emergence damping-off caused by soil-borne *Fusarium* spp., *Cochliobolus sativus*, and *Pythium* spp.; post-emergence damping-off caused by soil-borne *Fusarium* spp. and seed-borne *Aspergillus* spp.; seedling blight caused by seed-borne *Aspergillus* spp.; true loose smut (*Ustilago nuda*); covered smut (*U. hordei, U. kolleri*); false loose smut (*U. nigra*); loose smut (*U. tritici, U. avenae*); common bunt (*Tilletia caries, T. laevis*); barley leaf stripe (*Pyrenophora graminea*)	Root rot caused by soil-borne *Fusarium* spp., *Cochliobolus sativus*, and seed-borne *Fusarium* spp.; crown rot caused by seed-borne *Fusarium* spp.; seedling blight caused by seed-borne *Penicillium* spp.; seed rot, pre-emergent damping off and root rot caused by *Rhizoctonia solani*.

Application Information:

Raxil PRO is a ready-to-use treatment formulation for use in commercial seed treatment operations and for on-farm treatment with conventional seed treating which can accurately meter, mix and apply flowable seed treatment formulations.

How it Works:

The active ingredient tebuconazole is a triazole demethylation inhibitor (DMI) fungicide with systemic activity. The active ingredient prothioconazole is a demethylation inhibitor with broad-spectrum systemic activity. The active ingredient metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Insecticide Seed Treatment: May be mixed with *Stress Shield 600*.

Follow the label directions for each product and use the most restrictive precautions and limitations for either product.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labeled "This seed has been treated with *Raxil PRO*, which contains tebuconazole, prothioconazole and metalaxyl. When handling treated seed wear chemical-resistant gloves. DO NOT use for feed, food or oil processing. Store away from feeds and other foodstuffs."

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Keep container closed. Store in a cool, dry area and avoid excessive heat.

Environment: Toxic to aquatic organisms. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. Dispose of all excess treated seed. Left over seed may be double-sown around the headland or buried away from water sources. DO NOT leave exposed treated seed on soil surface. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface. The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable and/or the depth to the water is shallow.

Hazard Rating:

▽ Caution – Skin irritant

For an explanation of the symbols used here see page 11.

Raxil PRO Shield

Fungicide Group – 3, 4
Insecticide Group – 4
(Refer to page 346 and 493)

***Raxil PRO Shield* is a co-pack of *Raxil PRO* (tebuconazole, prothioconazole and metalaxyl fungicides, page 468) and *Stress Shield 600* (imidacloprid insecticide, page 447). For other detailed information on the component products see the product pages listed above.**

Company:

Bayer CropScience (*Raxil PRO* – PCP#30102; *Stress Shield 600* – PCP#30668)

Formulation:

Raxil PRO: 3.0 g per L tebuconazole, 15.4 g per L prothioconazole and 6.2 g per L metalaxyl formulated as a suspension. Container size – 10 L, 58.5 L, 175.5 L, 1000 L.

***Stress Shield 600* :** 600 g per L imidacloprid formulated as a suspension. Container size – 27 L.

Crops:

Wheat, barley and oat.

Diseases and Insects:

Diseases Contolled: Seed rot / pre-emergence damping-off caused by seed-borne *Fusarium* spp., *Aspergillus* spp. and *Cochliobolus sativus*; seed rot / pre-emergence damping-off caused by soil-borne *Fusarium* spp., *Cochliobolus sativus*, and *Pythium* spp.; post-emergence damping-off caused by soil-borne *Fusarium* spp. and seed-borne *Aspergillus* spp.; seedling blight caused by seed-borne *Aspergillus* spp.; true loose smut (*Ustilago nuda*); covered smut (*U. hordei, U. kolleri*); false loose smut (*U. nigra*); loose smut (*U. tritici, U. avenae*); common bunt (*Tilletia caries, T. laevis*); barley leaf stripe (*Pyrenophora graminea*).

Disease Suppressed: Root rot caused by soil-borne *Fusarium* spp., *Cochliobolus sativus*, and seed-borne *Fusarium* spp.; crown rot caused by seed-borne *Fusarium* spp.; seedling blight caused by seed-borne *Penicillium* spp.; seed rot, pre-emergent damping off and root rot caused by *Rhizotonia solani*.

Insects Controlled: Wireworm

Rates:

325 mL *Raxil PRO* and 17 to 50 mL of *Stress Shield 600* per 100 kg of seed.

Hazard Rating:

Warning – Poison (*Stress Shield 600*)

Caution – Skin irritant (*Raxil PRO*)

For an explanation of the symbols used here see page 11.

Raxil WW

Fungicide Group – 3, 4
Insecticide Group – 4A
(Refer to page 346 and 493)

Company:

Bayer CropScience

Formulation:

Raxil WW has two components: ***Raxil MD*** (PCP#27692) 5.0 g per L tebuconazole and 6.6 g per L metalaxyl formulated as a flowable seed treatment and ***Stress Shield*** (PCP#29610) 480 g per L imidacloprid formulated as a suspension.

Crops, Diseases, Insects, and Rates:

Crops:	Diseases:	Insects:	Rate of *Raxil MD* per 100 kg seed:	Rate of *Stress Shield* per 100 kg seed:
Wheat (durum, spring, winter), barley, oats	For diseases controlled and/or suppressed, refer to *Raxil MD* (page 467).	Wireworm	300 mL	21 to 63 mL*

* Use the higher rate when infestation pressures are expected to be heavy. DO NOT apply any subsequent application of a Group 4 Insecticide (i.e. in-furrow or foliar application) following treatment with *Stress Shield*.

How it Works:

The active ingredient tebuconazole is a triazole fungicide with broad-spectrum systemic activity. The active ingredient metalaxyl is an acylaline fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345. Imidacloprid is a chloronicotinyl insecticide with systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 492.

Tank Mixes:

None registered.

Restrictions:

See *Raxil MD* (page 467) and consult individual labels for *Raxil MD* and *Stress Shield* for additional information regarding use restrictions.

Resistance management: Refer to page 344 and 492.

Labelling: All bags containing treated seed must be labelled or tagged as follows: "This seed has been treated with *Raxil WW* (*Raxil MD* and *Stress Shield*) seed protectant which contains tebuconazole and metalaxyl fungicides and imidacloprid insecticide. DO NOT use for feed, food or oil processing. Store away from feeds and other foodstuffs."

Grazing: DO NOT graze or feed livestock on treated areas for four weeks after planting.

Re-cropping: No restrictions listed.

Storage: Low temperature storage is not recommended. Prior to and during application, treatments must be thoroughly agitated to ensure uniform mixing of the product. Due to the viscosity of the material, it should be kept above 10 °C prior to and during application. DO NOT apply direct heat to container.

Environment: DO NOT contaminate water, food, or feed by storage, disposal, or by cleaning of equipment. Cover or incorporate spilled treated seeds. Left over treated seed should be double-sown around the headland, or buried away from water sources.

Hazard Rating:

(!) Danger – Skin and eye irritant

For an explanation of the symbols used here see page 11.

Senator PSPT

Fungicide Group – 1
(Refer to page 346)

Company:

Nippon Soda Company Ltd. – PCP#26236
Distributed by Engage Agro Corporation

Formulation:

10% thiophanate-methyl formulated as dust.
Container size - 10 kg.

Crops and Diseases:

Control of fusarium rot, verticillium wilt, silver scurf (*Helminthosporium solani*) of potato. Also aids in control of seed piece decay and blackleg infections of potato.

Rate:

Use 500 g per 100 kg cut seed (one 10 kg bag treats 2,000 kg seed).

Application Information:

Seed piece treatment. Apply in a convenient container or by dust attachment over belt. Cut pieces should be treated within 6 hours of cutting. For optimum control of silver scurf, ensure that seed tubers are completely free of soil. Total skin coverage is essential. If planting is to be delayed more than 1 to 2 days, the treated pieces should be stored for 2 to 3 days in open crates before bagging. This product contains no colourant; an appropriate colourant must be added when this product is applied.

How it Works:

The active ingredient thiophanate-methyl is a benzimidazole fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store product in a dry place. Avoid contamination of feed or food stuffs.

Environment: DO NOT contaminate domestic or irrigation water supplies, lakes, streams and ponds.

Hazard Rating:

None listed.

Stadium

Fungicide Group – 11, 3, 12
(Refer to page 346)

Company:

Syngenta Canada – PCP# 31050

Formulation:

143 g per L azoxystrobin, 112 g per L difenoconazole and 143 g per L fludioxonil formulated as a suspension concentrate seed treatment.

Crops and Diseases:

For use in post-harvest treatment of potatoes to control fusarium dry rot (*Fusarium* spp.) and to suppress silver scurf (*Helminthosporium solani*).

Rate and Application Information:

Stadium is a suspension concentrate that must be diluted with water and applied at the rate of 32.5 mL per tonne of potatoes. Finally spray solution should deliver an application rate of 2 L (*Stadium* + water) per metric tonne of potatoes. Application is for in-line as an aqueous spray. Tubers should be rotating along a conveyor line in a single layer to ensure proper coverage. DO NOT make more than one post-harvest application to the tubers.

How it Works:

The active ingredient azoxystrobin is a methoxyacrylate (strobilurin) fungicide with broad spectrum activity to be used as a preventative and curative fungicide, difenoconazole is a triazole fungicide with broad-spectrum systemic activity and fludioxonil is phenylpyrrole fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: No restrictions listed.

Grazing: No restrictions listed.

Re-cropping: This product is restricted to table and processing potatoes.

Storage: Store in a cool dry place. Do not store food, beverages or tobacco products in storage area.

Environment: This product is toxic to fish and aquatic invertebrates. Do not apply directly to water or to areas where surface water is present. DO NOT allow contaminated waste water from the processing areas to entre lakes, streams, ponds or other waters. Do not contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

Warning – Poison

For an explanation of the symbols used here see page 11.

StorOx

Fungicide Group – U
(Refer to page 346)

Company:

Manufactured by BioSafe Systems Inc. – PCP#27432
Distributed in Western Canada by Brenntag Canada

Formulation:

27% hydrogen peroxide. Container size - 10 - 220 L.

Crops and Diseases:

Control of fusarium tuber rot, bacterial soft rot and silver scurf in potato.

Rate and Application Information:

Prior to storage and in storage treatment for harvested potato tubers.

As a spray treatment for newly harvested potatoes before storage: 100 mL of *StorOx* per 10 L water. Spray diluted solution on tuber to runoff to achieve full and even coverage. Use 4.15 to 8.3 L water per tonne of potatoes.

As application to potatoes in storage as a direct injection into humidification water: 100 mL *StorOx* per 10 L water. Apply diluted product for at least 20 minutes per day, based on a humidification airflow rate of 0.6 cfm.

Tank Mixes:

May be used in conjunction with a growth inhibitor during humidification. Should not be combined or mixed with pesticides or fertilizer.

How it Works:

Hydrogen peroxide is an inorganic compound with contact activity against fungi and bacteria. For more information refer to "Fungicide Modes of Action" on page 345.

Restrictions:

Storage: Store in cool, well ventilated area away from direct sunlight. Since *StorOx* is a strong oxidizing agent, contact with combustibles may cause fire.

Environmental: DO NOT discharge effluent containing *StorOx* into lakes, streams, ponds or other bodies of water. DO NOT permit this product to enter surface or ground water.

Hazard Rating:

⯃ Danger – Corrosive to eyes

◇ Warning – Skin irritant

Other Precautions: This product is corrosive to metal surfaces; rinse all application equipment thoroughly with water after use. Do not enter treated storage bins until the hydrogen peroxide air concentrations are below exposure levels established by occupational health and safety authorities.

For an explanation of the symbols used here see page 11.

Thiram 75WP

Fungicide Group – M3
(Refer to page 346)

Company:

Manufactured by Platform Specialty Products: – PCP# 27556

Formulation:

Thiram 75WP: 75% thiram formulated as wettable powder. Container sizes - 5 kg, 25 kg.

Diseases Controlled:

Seed decay, seedling blight, damping off.

Crops and Rates:

Crop:	Rate per 100 kg Seed:	Amount of Seed one 5 Kg Package Treats:
Mustard, grasses, alfalfa	360 g	1,389 kg
Dry bean, pea, soybean	100 to 140 g	3,571 to 5,000 kg
Field corn	120 g	4,166 kg
Sweet corn	220 g	2,272 kg
Safflower	200 g	2,500 kg

Application Information:

To apply as slurry treatment, pre-mix *Thiram 75WP* in water (as indicated below) and apply through commercial seed treating equipment.

How it Works:

The active ingredient thiram is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed should be labelled "DO NOT use for food or feed. This seed has been treated with thiram".

Grazing: DO NOT graze treated areas or feed clippings from treated areas to livestock.

Re-cropping: No restrictions listed.

Storage: Store in a cool, dry, ventilated place, away from feeds and foods. Keep away from flame, sparks and heat.

Environment: Treated seed may be harmful to birds if ingested. DO NOT contaminate any body of water.

Compatibility with rhizobia-based inoculants: *Thiram* is compatible with rhizobia, however, some restrictions may apply in storage length with *Thiram*-treated seed inoculated with rhizobia. Contact rhizobia manufacturer on use patterns with their rhizobia strain.

Hazard Rating:

☠ Warning – Poison

Other precautions: May irritate eyes, nose, throat and skin. May cause allergic eczema in sensitive individuals. Do not consume alcoholic beverages 24 hours before or after working with thiram.

For an explanation of the symbols used here see page 11.

Titan Emesto

Fungicide Group – 3, 7
Insecticide Group – 4
(Refer to page 346 and 493)

***Titan Emesto* is a co-pack of *Titan* (clothianidin insecticide, page 463) and *Emesto Silver* (penflufen and prothioconazole fungicides). For other detailed information on the component products see the product pages or labels for the products listed.**

Company:

Bayer CropScience Inc. (*Titan Insecticide* – PCP#27449; *Emesto Silver* – PCP# 30361)

Formulation and Rates:

Active ingredient:	***Titan*** **(PCP #27449)**	***Emesto Silver*** **(PCP #30361)**	***Titan Emesto***	
Container sizes:	1 L – 1000L	1 L – 200 L (available ONLY as co-pack)	(co-pack of *Titan* and *Emesto Silver*)	
			Rate, Insects, and Diseases Controlled:	
Clothianidin	600 g per L suspension	-	20.8 mL per 100 kg potato seed pieces for control of wireworms.	10.4 to 20.8 mL per 100 kg potato seed pieces for control of aphids, Colorado potato beetle, potato leafhopper and potato flea beetle.
Penflufen	-	100 g per L suspension	20 mL of *Emesto Silver* per 100 kg of potato seed pieces for control of seed borne black scurf, stem and stolon canker caused by *Rhizoctonia solani*, silver scurf caused by *Helminthosporium* solani and Fusarium tuber rot caused by *Fusarium* sp.	
Prothioconazole	-	18 g per L suspension		

Crop: Potato

Application Information:

For optimal disease control, good coverage of the seed piece is required. Seed pieces should be treated immediately after cutting. Apply specified dosage as a diluted spray using equipment that ensures uniform coverage of each seed piece. Apply only in areas with adequate ventilation or in areas that are equipped to remove spray mist or dust. Do Not use treated seed pieces for food, feed or fodder.

How it Works:

Clothianidin is a chloronicotinyl insecticide with systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493. The active ingredient penflufen is acarboxamide with systemic activity and prothioconazole is a demethylation inhibitor with broad spectrum activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Titan Emesto is a co-pack of *Emesto silver* fungicide and *Titan* insecticide. Follow the label direction for each product and use the most restrictive precautions and limitations for either product. No other tank mixes are listed.

Restrictions:

Resistance management: Refer to page 344.

Maximum number of applications: DO NOT apply more than 150 mL of slurry per 100 kg of seed pieces.

Grazing: None listed.

Re-cropping: Immediate plant back possible for potatoes, corn, and canola for products treated with Titan. A plant back interval of 30 days is required for cereals, grasses, nongrass animal feeds, soybeans and dry beans. A 1-year plant back interval is required for leafy, root and tuber vegetables.

Storage: Store in cool, dry area away from direct sunlight, food and feed. DO NOT allow prolonged storage in temperatures that exceed 25°C or go below 0°C or in direct sunlight. Treated seed stored for periods in excess of 9 months should be tested for germination before planting.

Environment: Avoid discharging effluent containing this product into sewer systems and aquatic areas. Toxic to aquatic organisms. May contaminate ground water. Any spilled or exposed seeds should be incorporated into the soil or otherwise cleaned up from the soil surface.

Hazard Rating:

☠ Warning – Poison

For an explanation of the symbols used here see page 11.

Trilex AL

Fungicide Group – 11, 4
(Refer to page 346)

Company:

Bayer CropScience (PCP# 29160)

Formulation:

13.5 g per L trifloxystrobin and 10.8 g per L metalaxyl formulated as a suspension concentrate.

Crops and Disease:

Protection of bean, chickpea, pea, lentil and soybean seed and seedlings from certain seed and soil-borne diseases caused by *Rhizoctonia solani*, *Fusarium* spp., and *Pythium* spp. Also protects from seed rot / pre-emergence damping-off, post-emergence damping-off, and seedling blight caused by *Botrytis cinerea* on lentil; and seed decay / pre-emergence damping-off caused by *Phomopsis longicolla* on soybean. It also provides suppression of seed-borne ascochyta blight caused by *Ascochyta* spp. on lentil, pea and chickpea.

Rate:

370 ml per 100 kg of seed.

Application Information:

The ready-to-use formulation is designed for commercial or on-farm treating with conventional seed treating equipment that can accurately control application rates and provide a good distribution of the chemical onto the seed in the mixing chamber. Uniform application on seed is necessary to ensure seed safety and best disease protection. If *Trilex AL* is diluted with water by greater than 10% by volume, ensure agitation of the mixture prior to application to seed.

How it Works:

Trifloxystrobin is a strobilurin fungicide with broad spectrum preventative activity. Metalaxyl is an acylalanine fungicide with systemic activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: All bags containing treated seed for sale or use in Canada must be labelled or tagged as follows: "This seed has been treated with *Trilex AL* containing trifloxystrobin and metalaxyl. Use chemical-resistant gloves when handling treated seed. Do not use for feed, food or oil processing. Store away from feeds and other foodstuffs."

Grazing: DO NOT graze or feed livestock on treated areas for 4 weeks after planting.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Store in a cool, dry place and avoid excessive heat. Keep container closed.

Environment: Toxic to aquatic organisms. DO NOT discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other waters. Dispose of all excess treated seed. Left over treated seed may be double-sown around the headland or buried away from water sources in accordance with local requirements. Residues of this product demonstrate the properties and characteristics associated with chemicals detected in groundwater. The use of this product may result in contamination of groundwater particularly in areas where soils are permeable (e.g., sandy soil) and/or depth to the water table is shallow.

Compatibility with rhizobia-based inoculants: *Trilex AL* is compatible with rhizobia-based inoculants. Check with inoculant manufacturers for further details prior to use.

Hazard Rating:

None listed.

Trilex EverGol

Fungicide Group – 4, 7, 11
(Refer to page 346)

Trilex EverGol **is a co-pack of** ***Trilex Component A*** **(penflufen and trifloxystrobin) and** ***Trilex Component B*** **(metalaxyl).**

Company:

Bayer CropScience (*Trilex Component A* – PCP#30644; *Trilex Component B* – PCP#30645)

Formulation:

Trilex Component A: 154 g per L penflufen and 154 g per L trifloxystrobin formulated as a suspension.

Container size – 1.5L Trilex Component A or in bulk package 6.49 L.

Trilex Component B**:** 317 g per L metalaxyl formulated as a suspension.

Container size – 0.96L Trilex Component B or in bulk package 4.15 L.

Crops, Diseases and Rates:

Crop:	Rate per 100 kg of seed:		Diseases Controlled:		Diseases Suppressed:	
	Trilex Component A	*Trilex Component B*	*Trilex Component A*	*Trilex Component B*	*Trilex Component A*	*Trilex Component B*
Bean	25 mL	16 mL	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by *Rhizoctonia solani, Fusarium* spp., and *Botrytris cinerea;* seedling blight caused by *B. cinerea*	Seed rots and seedling blights caused by *Pythium* spp.	-	-
	25 to 32 mL	-	-	-	Seedborne ascochyta blight caused by *Ascochyta* spp.	-
Chickpea, pea	25 mL	16 mL	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by *Rhizoctonia solani, Fusarium* spp., and *Botrytris cinerea;* seedling blight caused by *B. cinerea*	Seed rots and seedling blights caused by *Pythium* spp.	-	-
	25 to 32 mL	-	-	-	Seedborne ascochyta blight caused by *Ascochyta* spp.	-

See footnotes on following page.

Continued...

Crops, Diseases, and Rates *continued*:

Crop:	Rate per 100 kg of seed:		Diseases Controlled:		Diseases Suppressed:	
	Trilex Component A	*Trilex Component B*	*Trilex Component A*	*Trilex Component B*	*Trilex Component A*	*Trilex Component B*
Lentil	25 mL	16 mL[1]	Seed decay / pre-emergence damping-off and post-emergence damping-off caused by *Rhizoctonia solani*, *Fusarium* spp., and *Botrytris cinerea*; seedling blight caused by *B. cinerea*	*Pythium* seed rot	-	-
	25 to 32 mL	-	-	-	Seedborne ascochyta blight caused by *Ascochyta* spp.	-

[1] *Trilex Component B* is for use on low tannin lentils destined for export or seed production only and no foliar application of metalaxyl can be used on low-tannin lentils grown from metalaxyl-treated seed.

Application Information:

Trilex Component A is a seed treatment formulation for use in commercial seed treatment operations, and for on-farm treating with conventional seed treating equipment which can accurately meter and apply flowable seed treatment formulations. This product is recommended to be diluted with water or another suitable liquid just prior to application to ensure uniform coverage on the seed during the application process. Uniform application to seed is necessary to ensure optimum performance. Allow seeds to dry before bagging, storing or seeding.

Trilex Component B should be mixed with water to form a slurry seed treatment. Mix 500 mL of slurry per 100 kg of seed to be treated. The slurry should be applied as a spray into the mixing chamber of the seed treating equipment to ensure good coverage. When preparing the slurry the following procedure should be used: 1) partially fill the mixing tank with water; 2) add the required quantity of *Trilex Component B* onto the water surface; 3) allow product to disperse and then switch on agitation; 4) top up with extra water to required volume and maintain agitation during use; and 5) add colourant last.

How it Works:

Trilex Component A: The active ingredient penflufen is a carboxamide (SDHI) fungicide with systemic activity. The active ingredient trifloxystrobin is a strobilurin fungicide with broad spectrum preventative activity.

Trilex Component B: The active ingredient metalaxyl is an acylalanine fungicide with systemic activity.

For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Fungicide Seed Treatments: In addition to *Trilex Component B*, *Trilex Component A* may be mixed with *Allegiance FL*.

Follow the label directions for each product and use the most restrictive precautions and limitations for either product.

Bayer CropScience also supports the tank-mix of *Stress Shield 600* with *Trilex EverGol*. Apply mixes according to the most restrictive use limitations.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed must be labeled "This seed has been treated with *Trilex Component A* (containing penflufen and trifloxystrobin) and *Trilex Component B* (containing metalaxyl). Wear long-sleeved shirt, long pants and chemical-resistant gloves when handling treated seed. DO NOT use for feed, food or oil processing. Store away from feeds and other foodstuffs."

Grazing: DO NOT graze or feed livestock on treated areas for four weeks after planting.

Re-cropping: Registered crops for *Trilex Component A*, as well as canola, mustard, rapeseed, soybean, alfalfa, corn and cereal grains, may be replanted at any time. For all other crops, DO NOT plant back within 30 days of seeding with *Trilex Component A*-treated seed.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Keep container closed. Store in a cool, dry area. Do not store in direct sunlight. Do not store *Trilex Component A* above 40°C or below -10°C. Do not store *Trilex Component B* above 35°C or below 0°C.

Environment: Toxic to aquatic organisms. Treated seed may be toxic to birds and other wildlife. DO NOT discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other waters. Dispose of all excess treated seed. Left over seed may be double-sown around the headland or buried away from water sources. DO NOT leave exposed treated seed on soil surface. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface.

The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable and / or the depth to the water is shallow.

Hazard Rating:

▽ Warning – Skin and eye irritant (*Trilex Component B*)

For an explanation of the symbols used here see page 11.

Triticonazole

Charter RTU / Armour RTU / Armour

Fungicide Group – 3

(Refer to page 346)

Company:

BASF Canada (*Charter RTU* – PCP#29400, *Armour RTU* – PCP#30226, *Armour* – PCP#29296)

Formulation:

Charter RTU – 16.8 g per L triticonazole formulated as a liquid flowable seed treatment. Container size - 9.3 L and 200 L drums.

Armour RTU – 16.8 g per L triticonazole formulated as a liquid flowable seed treatment. Container size - 9.3 L.

Armour – 25 g per L triticonazole formulated as a liquid flowable seed treatment. Container size - 10 L (containing 6.2 L *Armour*).

Crops, Diseases and Rates:

Crop:	Rate per 100 kg Seed: *Charter RTU, Armour RTU*[1]	Rate per 100 kg Seed: *Armour*	Diseases Controlled:	Diseases Suppressed[2]:
Wheat	300 mL	200 mL	Seed rot caused by *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; loose smut (*Ustilago tritici*); common bunt (*Tilletia tritici, T. laevis*)	*Fusarium* crown and root rot; common root rot (caused by *Cochliobolus* spp.); seedling blight caused by *Cochliobolus sativus*
Barley	300 mL	200 mL	Seed rot caused by *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; true loose smut (*Ustilago nuda*); covered smut (*U. hordei*); false loose smut (*U. nigra*)	
Oat	300 mL	200 mL	Seed rot caused by *Fusarium* spp.; seedling blight caused by seed-borne *Fusarium* spp.; loose smut (*Ustilago avenae*); covered smut (*U. kolleri*)	

[1] *Charter RTU* and *Armour RTU* are ready to use formulations. No water or dye is required to be added.

[2] Suppression means consistent control at a level which is not optimal but is still of commercial benefit.

Application Information:

Charter RTU and *Armour RTU* are ready to use seed treatment formulations and *Armour* is a concentrated seed treatment formulation. These products are for use in commercial seed plants, in on-farm standard gravity flow or mist type treatment machines, and in on-the-go air seeder treatment systems. Agitate or shake well prior to usage. Uneven seed coverage may result in poor levels of disease control. Seed should be well conditioned and cleaned before treating. Treated seed should not require drying after treatment.

Charter RTU and *Armour RTU* Water Volume: *Charter RTU* and *Armour RTU* are ready to use formulations and no additional water is required. Consult the seed treatment application equipment manufacturer for specific application instructions for use of various seed treatment application machines.

Armour Water Volume: Concentrate requires the addition of water. Mix 2 parts seed treatment with 1 part water. Consult the seed treatment application equipment manufacturer for specific application instructions for use of various seed treatment application machines.

How it Works:

The active ingredient triticonazole is a triazole fungicide that provides systemic broad spectrum protection against seed- and soil-borne diseases. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance management: Refer to page 344.

Labelling: Treated seed should be labelled "This seed has been treated with (*Charter RTU*, *Armour RTU*, or *Armour*) Seed Treatment Fungicide containing triticonazole, a Group 3 fungicide. DO NOT use for food, feed or oil processing". Store treated seed under cool, dry conditions.

Grazing: No restrictions listed.

Re-cropping: No restrictions listed.

Storage: Store product in the original container. Keep container closed. Any seed treated with this product must be either thoroughly stained with a conspicuous color or coated with a material that renders it conspicuous. DO NOT store treated seed for more than 18 months. Treated seed stored for more than 6 months should be tested for germination before use. Thoroughly clean auger after handling treated seed before using same auger for handling commercial or feed grains.

Environment: DO NOT feed treated seed to, or otherwise expose, wildlife or domestic birds. DO NOT contaminate domestic or irrigation water supplies, lakes, streams, ponds or any body of water with the chemical, used containers, treated seed or bags. DO NOT contaminate water by cleaning of equipment or disposal of wastes.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Vibrance 500FS

Fungicide Group – 7
(Refer to page 346)

***Vibrance 500FS Seed Treatment* is available for on-farm use on soybeans or as a co-pack for other crop uses as a co-pack (see *Cruiser Maxx Vibrance Beans, Helix Vibrance, Vibrance Maxx RTA/RFC, Vibrance XL Co-Pack*).**

Company:

Syngenta Canada (PCP #30438)

Formulation:

500 g per L sedaxane formulated as a suspension.

Container size – 1L to 1050 L

Crops and Diseases:

Crop:	Diseases Controlled:
Barley	True loose smut caused by *Ustilago nuda*; seed decay, seedling blight and damping-off caused by *Rhizoctonia solani*
Wheat	True loose smut caused by *Ustilago tritici*; seed decay, seedling blight and damping-off caused by *Rhizoctonia solani*
Oats, rye, and triticale	Seed decay, seedling blight and damping-off caused by *Rhizoctonia solani*
Canola, soybeans, chickpea, lentil, bean, faba bean and pea	Seed decay, seedling blight and damping-off caused by *Rhizoctonia solani*

Rate:

5 to 10 mL product per 100 kg of seed. Use the low rate for control of pre-emergent damping-off, seedling decay, or seedling blight. Use the high rate for extended control of post-emergent damping-off and seedling blight or high disease pressure or high levels of seed-borne infections like smut.

Application Information:

Vibrance 500FS is for use on-farm and in closed transfer commercial seed treatment facilities. No open transfer is permitted for commercial seed treatment of barley, wheat, oats, rye, triticale and soybean. For pulse crops on farm and commercial seed treatment (using either an open or closed transfer application system) is permitted. No on-farm seed treatment is permitted for canola. Note: treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour. This product contains no colourant. An appropriate colourant must be added when this product is applied to seed. Regulations pertaining to the "Seeds Act" must be strictly adhered to when using this product. Users are responsible for ensuring that the treated seed, when dried and ready for bagging, has an unnatural colour.

How it Works:

Sedaxane is a succinate dehydrogenase inhibitor fungicide with preventative and systemic activity that inhibits fungal metabolism by binding to the succinate dehydrogenase enzyme to disrupt cellular respiration and energy generation. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Consult each product label for registered use rates and follow all label use instructions. Read the label directions for each product and follow the most restrictive label precautions and limitations.

Small-grain cereals (Wheat, Barley, Oats, Rye, and Triticale): *Dividend XL RTA* for disease control in cereals. For insect control, *Cruiser 5FS* (in commercial seed treatment facilities ONLY with closed transfer). This tank-mix option is only valid for those crops common to the registered labels of both products.

Soybeans: *Apron Maxx RTA* or *Apron Maxx RFC* for disease control. For insect control, *Vibrance 500FS* may be mixed with *Cruiser 5FS* or *Cruiser Maxx Beans* or (in commercial seed treatment facilities ONLY with closed transfer).

Restrictions:

Resistance management: Refer to page 344.

Labelling: All seed must be labelled "This seed has been treated with sedaxane fungicide. Wear long-sleeved shirt, long pants, and chemical-resistant gloves when handling treated seed. Do not graze or feed livestock on seeded area for 45 days after planting. Do not use for food, feed or oil processing. Store away from food and feed".

Grazing: DO NOT graze or feed livestock on treated areas for 45 days after planting.

Re-cropping: DO NOT plant any crop other than those on the product label within 60 days to fields in which seed treated with *Vibrance 500FS* seed treatment were planted.

Storage: Store away from food and feed.

Compatibility with *Rhizobia*-based inoculants: *Vibrance 500FS* is compatible with Rhizobium based inoculants. Please check with inoculant manufactures for details prior to use. Note: Mixing with inoculants may increase drying time while treating extending the processing time.

Environment: Toxic to aquatic organisms. Do not contaminate food, feed, domestic or irrigation water supplies, lakes, streams and ponds. Treated seed is toxic to small wild animals. Any spilled or exposed seed must be incorporated into the soil or otherwise cleaned up from the soil surface

.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Vibrance Maxx RTA/RFC / Cruiser Maxx Pulses

Insecticide Group – 4
Fungicide Group – 4, 12

(Refer to page 346 and 493)

Available to commercial seed treaters only.

***Cruiser Maxx Pulses* is a co-pack containing *Cruiser 5FS* (page 435) and *Apron Maxx RFC* (page 432). For more detailed information on the component products, consult individual pages in this guide as well as product labels. *Vibrance Maxx RTA* is a co-pack of *Apron Maxx RTA* (page 432) and *Vibrance 500 FS* (page 482). *Vibrance Maxx RFC* is a co-pack of *Apron Maxx RFC* (page 432) and *Vibrance 500 FS* (page 482). For other detailed information on the component products see the product pages listed above.**

Company:

Syngenta Canada

Formulation and Rates:

Active ingredient:	Active Ingredient Formulation:						
	Cruiser 5FS (PCP #27045)	*Apron Maxx RFC/RTA*		*Cruiser Maxx Pulses* (co-pack)	*Vibrance 500 FS*	*Vibrance Maxx*	
		RFC (PCP #28817)	*RTA* (PCP #27577)			*RFC copack*	*RTA copack*
Thiamethoxam	47.6%	-		**Rate:** 100 mL *Apron Maxx RFC* plus 50 to 83 mL *Cruiser 5FS* per 100 kg seed	-	-	
Fludioxonil	-	2.31%	0.73%		-	**Rate:** 100 mL *Apron Maxx RFC*	**Rate:** 325 mL *Apron Maxx RTA*
Metalaxyl-M and S-isomer	-	3.46%	1.10%		-		
Sedaxane	-	-		-	500 g per L	**Rate:** 5 to 10 mL *Vibrance 500 FS* per 100 kg of seed	

Crops, Diseases and Insects:

Cruiser Maxx Pulses can be used to control insects listed for *Cruiser 5FS* (see page 435) and diseases listed for *Apron Maxx RFC* (see page 432) in pea, lentil, faba bean, lupin and chickpea. *Vibrance Maxx RFC* and *Vibrance Maxx RTA* can be used to control diseases listed for *Apron Maxx RFC* and *Apron Maxx RTA* (see page 432) and *Vibrance 500 FS* (see page 482) in pea, lentil, faba bean, bean and chickpea.

Application Information

For use only in commercial seed treatment facilities with closed transfer including closed mixing, loading, calibrating, and closed treatment equipment. No open transfer of seed treatments. All seed treated with this product must be conspicuously coloured at the time of treatment. Treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour.

How it Works:

For more information refer to Cruiser 5FS (page 435) and "Insecticide Groups Based on modes of Action" (page 493) Apron Maxx RFC/RTS (page 432), Vibrance 500FS (page 482) and "Fungicide Modes of Action" on page 345.

Restrictions:

Resistance management: Refer to page 344.

Labelling: All seed must be labelled "This seed has been treated with the insecticide, thiamethoxam and metalaxyl M (including R- and S-isomer) fludioxonil and/or sedaxane fungicides. DO NOT use for food, feed or oil processing."

Grazing: DO NOT graze or feed livestock on treated areas for 45 days after planting.

Re-cropping: DO NOT plant any crop other than soybeans, dry beans, chickpeas, lentils and dry peas (including field peas) within 45 days in which treated seeds were planted.

Storage: Store away from food and feed. Ideal storage temperature is above freezing and below 30°C. If product should freeze, bring to room temperature, then ensure the contents are mixed well prior to application.

Environment: This product is toxic to fish and other aquatic organisms. DO NOT apply this product directly to aquatic habitats, estuaries or marine habitats. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. DO NOT contaminate food, feed, domestic or irrigation water supplies, lakes, streams and ponds. If treated seed is spilled outdoors or in areas accessible to birds, promptly clean up or bury to prevent ingestion.

Compatibility with rhizobia-based inoculants: *Cruisier Maxx Pulses* is compatible with rhizobium-based inoculants. Please check with inoculant manufacturers for details prior to use. Mixing with inoculants may increase drying time while treating extends the processing time. Recalibrate equipment before planting treated seed.

Hazard Rating:

Caution – Poison and Skin Irritant.

For an explanation of the symbols used here see page 11.

Vibrance Quattro / Vibrance XL Cruiser Maxx Vibrance Cereals / Cruiser Vibrance Quattro

Insecticide Group – 4
Fungicide Group – 3, 4, 7, 12
(Refer to page 346 and 493)

Available to commercial seed treaters only.

Company:

Syngenta Canada – PCP# 31408

Formulation and Rates:

Active ingredient:	Active Ingredient Formulation:						
	Cruiser Maxx Vibrance Cereals **(PCP #30436)** liquid suspension	*Cruiser Vibrance Quattro* **(PCP #31453)** suspension	*Dividend XL RTA* **(PCP #25777)** flowable seed treatment	*Vibrance XL Co-Pack*	*Vibrance 500 FS* **(PCP #30438)** suspension	*Vibrance XL* **(PCP #30437)** suspension	*Vibrance Quattro* **(PCP #31408)** suspension
Container sizes:	2 x 10 L, 115 L, 450 L		2 x 10 L, 115 L, 450 L (available ONLY for co-packs)		1L to 1050 L	2 x 5.54 L	
Thiamethoxam	30.7 g per L	61.5 g per L	-	-	-	-	-
Difenconazole	36.9 g per L	36.9 g per L	3.37%	3.37%	-	66.2 g per L	36.8 g per L
Metalaxyl[1]	9.5 g per L	9.2 g per L	0.27%	0.27%	-	16.5 g per L	9.2 g per L
Sedaxane	8.0 g per L	15.4 g per L	-	500 g per L	500 g per L	13.8 g per L	15.4 g per L
Fludioxonil	-	7.7 g per L	-	-	-	-	7.6 g per L
Rate	325 mL or 650 mL per 100 kg of seed[2, 3, 4]	325 mL per 100 kg of seed[3, 4]	325 to 650 mL product per 100 kg of seed[2]	Refer to *Dividend XL RTA* and *Vibrance 500FS* formulations and rates	5 to 10 mL product per 100 kg of seed	180 to 360 mL product per 100 kg of seed[2]	325 mL per 100 kg of seed

[1] *Dividend XL* contains Metalaxy-M; *Vibrance XL* contains metalaxy-M and S isomers

[2] Use the higher rate if a) There is a history of high disease pressures in the field, or b) where conditions favour seed-borne and soil-borne pathogens, or c) when controlling seed-borne *Septoria* or early season Septoria leaf blotch, or d) if control of wire- worm is required or if wireworm populations are expected to be moderate to high; or e) where high levels of seed-borne infections like smuts are high.

[3] These products provide suppression of wireworm activity at the 325 ml per 100 kg seed rate; however, if pressure is moderate to high or control is required, use the 650 mL per 100 kg seed rate to achieve 20 g thiamethoxam per 100 kg seed. Commercial seed treaters may tank mix *Cruiser Maxx Vibrance Cereals* with *Cruiser 5FS* to achieve a total use rate of

20 to 30 g of thiamethoxam per 100 kg seed. Consult labels for use rates and instructions.

[4] For control of European chafer activity on wheat and barley, *Cruiser Maxx Vibrance Cereals* may be mixed with *Cruiser 5FS* to achieve a total use rate of 30 g of thiamethoxam per 100 kg seed. Consult labels for use rates and instructions. This tank mix may be applied in commercial seed treatment facilities ONLY.

Crops, Diseases and Insects:

Crop:	**Diseases Controlled:**	**Diseases Suppressed[3]:**	**Insects (ONLY for products containing thiamethoxam):**
Barley, winter wheat, spring wheat, rye, and triticale, and oats	General seed rots[1]; seedling blight, root rot, and damping-off caused by seed- and soil-borne *Fusarium* and soil-borne *Pythium*;	Common root rot (*Cochliobolus* spp.)	Suppression of wireworm[3] (*Agriotes*, *Limonius*, and *Melanotus* spp.)
Oats	Covered smut (*Ustilago kolleri*), loose smut (*U. avenae*); seedling blight, root rot, and damping-off caused by seed- and soil-borne *Rhizoctonia* spp.		
Rye	Common bunt (*Tilletia caries*); dwarf bunt[2] (*T. controversa*)	Fusarium crown and foot rot; take-all (*Gaeumannomyces graminis* var. *tritici*)	
Triticale	Loose smut (*Ustilago tritici*)		Suppression[3] or control of wireworm (*Agriotes*, *Limonius*, and *Melanotus* spp.)
Barley	Covered smut (*Ustilago hordei*); false loose smut (*U. nigra*) Seedling blight, root rot, and damping-off caused by seed- and soil-borne *Rhizoctonia* spp. True loose smut (*Ustilago nuda*)		
Spring wheat	Common bunt[2] (*Tilletia tritici, T. laevis*) loose smut (*Ustilago tritici*); seedling blight, root rot, and damping-off caused by seed- and soil-borne *Rhizoctonia* spp.		
Winter wheat	Common bunt (*Tilletia tritici, T. laevis*)[2]; dwarf bunt (*T. controversa*)[2]; loose smut (*Ustilago tritici*); seedling blight, root rot, and damping-off caused by seed- and soil-borne *Rhizoctonia* spp. Seed-borne septoria leaf blotch (early season foliar disease control for first 4 weeks after planting; for full season control apply a foliar fungicide according to label directions)		

[1] General seed rots controlled include those caused by saprophytes such as *Fusarium, Pythium, Penicillium* and *Aspergillus*.

[2] Controls both seed- and soil-borne bunts (common, dwarf).

[3] Suppression means consistent control at level which is not optimal but is still of commercial benefit.

Note: When seed is treated for post-planting protection against registered pests, these products will also provide protection during post-treatment storage of the seed against damage from many storage insect pests. Seed treated with thiamethoxam has been tested and found to be effective against rusty grain beetle, saw-toothed grain beetle, red flour beetle, rice weevil, lesser grain borer, European corn borer and Indian meal moth. It is recommended that seed with existing populations of storage pests be fumigated prior to treating and storage of that seed.

Application Information:

Vibrance XL is for use on-farm and commercial seed treatment facilities. No open transfer is permitted for commercial seed treatment of barley, wheat, oats, rye and triticale. Uneven or incomplete seed coverage may not give the desired level of disease control. In order to ensure uniform coverage with the 5.54 L *Vibrance XL* containers, add water to the 10 L level and mix thoroughly to form a slurry. Adjust application rate accordingly.

These products may contain a pigment that will adequately colour treated seed. However, ensure that treated seed has an unnatural colour after treatment, when dried and ready for bagging. Regulations pertaining to the Seeds Act must be strictly adhered to when using this product. An appropriate colourant must be added when this product if the pigment does not colour the seed adequately. Note: treatment of highly mechanically scarred or damaged seed or seed known to be of low vigour and poor quality may result in reduced germination and / or reduction of seed and seedling vigour.

How it Works:

Thiamethoxam is a seed treatment insecticide in the neonicotinoid class of chemistry that controls listed chewing and sucking insects through contact and systemic activity. For more information refer to "Insecticide Groups Based on Modes of Action" on page 493. The active ingredient difenoconazole is a triazole fungicide with broad-spectrum, systemic activity. Metalaxyl-M is an acylalanine fungicide with systemic activity against diseases caused by the Oomycetes, including *Pythium* damping-off. Sedaxane is a succinate dehydrogenase inhibitor fungicide with systemic activity that inhibits fungal metabolism by binding to the succinate dehydrogenase enzyme to disrupt cel lular respiration and energy generation. Fludioxonil is phenylpyrrole fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

Vibrance Quattro may be mixed with *Cruiser 5FS* (closed transfer system only) for treatment of wheat, barley, and triticale. Refer to label for details. *Cruiser Maxx Cereals Vibrance* may be mixed with 325 mL of *Dividend XL RTA* if there is a history of high disease pressures in the field, where field conditions favour seed-borne and soil-borne pathogens, or c) when controlling seed-borne *Septoria*. Consult each product and follow the most restrictive label precautions and limitations.

Restrictions:

Resistance management: Refer to page 344 and 492. Thiamethoxam is a Group 4 Insecticide. Do not make any subsequent application of a Group 4 Insecticide (i.e., in-furrow or foliar application) following treatment with these products. Experience has shown that strains of fungus resistant to metalaxyl-M (and S-isomer) may develop. Failure to control the disease will result in crop damage and / or yield losses. If disease appears in a treated field, consult the government extension specialist immediately.

Labelling: Treated seed must be labelled (listing only the applicable active ingredients) as follows: "This seed has been treated with thiamethoxam insecticide, difenoconazole, metalaxyl- M (and S-isomer), sedaxane and fludioxonil fungicides. When handling and planting treated seed, workers should wear cotton coveralls over a long-sleeved shirt, long pants, chemical-resistant gloves, and work boots. Wear a suitable dust mask when transferring seed to a storage bin. DO NOT graze or feed livestock on seeded area for 45 days after planting. DO NOT use for food, feed or oil processing. Store away from food and feed."

Grazing: DO NOT graze or feed livestock on treated areas for 45 days after planting.

Re-cropping: DO NOT plant any crop other than cereals within 60 days to fields in which treated seed were planted.

Storage: Store away from food and feed. Ideal storage temperature is above freezing and below 30°C. If product should freeze, bring to room temperature, and then ensure the contents are mixed well prior to application.

Environment: Toxic to aquatic organisms. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes. DO NOT contaminate food, feed, domestic or irrigation water supplies, lakes, streams and ponds. Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned-up from the soil surface.

Hazard Rating:

▽ Potential skin sensitizer.

▽ Caution – Poison

◇ Warning – Contains the allergen sulfites.

For an explanation of the symbols used here see page 11.

Vitaflo Brands

Fungicide Group – 7, M3
(Refer to page 346)

Company:

Manufactured by Platform Specialty Products (*Vitaflo 280* PCP#11423)

Manufactured by Interprovincial Cooperative Limited (*Vitaflo SP Fungicide* PCP#30381)

Manufactured for Loveland Products by Interprovincial Cooperative Limited (*Vitaflo Fungicide* PCP#30380)

Formulation:

Vitaflo 280/Vitaflo Fungicide/Vitaflo SP Fungicide: : 15.59% carbathiin and 13.25% thiram formulated as a liquid suspension.

Container sizes - 10 L, 55L, 100 L, 200 L, 1000 L.

Crops, Diseases and Rates:

Crop:	Rate per 100 kg Seed:	Diseases Controlled:	Diseases Suppressed[4]:
Barley	230 to 330[1] mL	False loose smut (*Ustilago nigra*); true loose smut (*U. nuda*); covered smut (*U. hordei*); leaf stripe (*Pyrenophora graminea*); seed rot and seedling blight caused by *Pythium* spp., *Penicillium* spp., *Fusarium* spp. and *Cochliobolus sativus*; seed rot due to storage fungi *Aspergillus* and *Alternaria* spp.	Suppression of root rot caused by *C. sativus* and *Fusarium* spp.; suppression of net blotch (*Pyrenophora teres*)
Wheat	230 to 330[1] mL	Loose smut (*Ustilago tritici*); common bunt (*Tilletia tritici, T. laevis*); seed-borne dwarf bunt (*T. controversa*); seed-borne *Septoria*; seed rot and seedling blight caused by *Cochliobolus sativus, Fusarium, Pythium, Aspergillus, Penicillium* and *Alternaria* spp.; seed rot due to storage fungi *Aspergillus* and *Alternaria* spp.	Suppression of root rot caused by *Cochliobolus sativus* and *Fusarium* spp.
Oat	330 mL	Loose smut(*Ustilago avenae*); covered smut (*U. kolleri*); seed rot seedling blight caused by *Fusarium, Pythium, Penicillium;* seed rot due to storage fungi *Aspergillus* and *Alternaria* spp.	Suppression of root rot caused by *Cochliobolus sativus*
Rye	230 to 330[1] mL	Stem smut (*Urocystis occulta*); damping off; seed rot and seedling blight caused by *Fusarium, Pythium, Penicillium* and *Cochliobolus sativus;* seed rot due to storage fungi *Aspergillus* and *Alternaria* spp.	Suppression of root rot caused by *Cochliobolus sativus* and *Fusarium* spp.
Triticale	200 mL	Seed rot, damping off and seedling blight caused by *Fusarium, Pythium, Penicillium,* and *Cochliobolus sativus.*	–
Dry bean	260 mL	Early season seed rot, seedling blight, and root rot caused by *Rhizoctonia solani;* seed-borne anthracnose (*Colletotrichum lindemuthianum*). Will not protect from wind borne spores. This product will not control anthracnose if seed is severely infected.	–
Corn (field & sweet)	280 560 to 748[2] mL	Seed rot and damping off caused by *Fusarium, Pythium,* and *Penicillium* spp. and seed-borne head smut (*Sporisorium holci-sorghi*). Will not control soil-borne head smut.	–
Flax	525 mL	Seed rot, root rot and seedling blight caused by *Rhizoctonia solani* and *Fusarium* spp. DO NOT use slurry treatment for flax, use dilution.	–

See footnotes on following page.

Continued...

Crops, Diseases and Rates *continued*:

Crop:	Rate per 100 kg Seed:	Diseases Controlled:	Diseases Suppressed[4]:
Lentil	330 mL	Seed rot, seedling blight, and early season root rot caused by *Botrytis cinerea, Rhizoctonia solani, Fusarium* and *Pythium* spp.	–
Pea	260 to 330[3] mL	Seed rot and seedling blight caused by *Ascochyta* (*Mycosphaerella* spp.), *Rhizoctonia solani, Fusarium* and *Pythium* spp.	–
Soybean	260 mL	Seed rot and seedling blight caused by *Rhizoctonia solani, Phomopsis* and *Fusarium* spp.	–

[1] The low rate will give partial control of true loose smut in wheat/barley and stem smut in rye. Use the high rate for septoria, seed rot and seedling blight, and suppression of root rot. Also use the high rate (330 mL per 100 kg) for dwarf bunt control in winter wheat.

[2] Use 560 to 750 mL per 100 kg seed to control head smut of corn.

[3] Use high rate (330 mL per 100 kg) on pea seed to control ascochyta (*Mycosphaerella pinodes*).

[4] Suppression means consistent control at a level which is not optimal but is still of economic benefit.

Application Information:

Designed to be used undiluted in commercial seed treaters. Undiluted product can be used at temperatures down to -20°C. Centrifugal pumps are not recommended for pumping product. Centrifugal pumps are not recommended for pumping product. Peristaltic pumps (positive displacement) using polypropylene lines with a minimum inside diameter of 2 cm are recommended. If containers have been in storage, some settling may occur and require agitation.

How it Works:

The active ingredient carbathiin is a carboximide fungicide with systemic activity and the active ingredient thiram is a dithiocarbamate fungicide with contact activity. For more information refer to "Fungicide Modes of Action" on page 345.

Tank Mixes:

None registered.

Restrictions:

Resistance managment: Refer to page 344.

Labelling: Treated seed must be labelled as follows "This seed has been treated with *Vitaflo 280, Vitaflo Fungicide,* or *Vitaflo SP Fungicide* liquid seed protectant containing carbathiin and thiram. Do not use for feed, food, or oil processing."

Grazing: DO NOT graze or feed livestock on treated area for four weeks after planting except for the following crops: Soybean - DO NOT graze or feed livestock on forage and hay on treated areas; Bean - DO NOT graze or feed on bean forage for 60 days; Barley, oat, wheat - DO NOT graze or feed on treated area for 6 weeks.

Re-cropping: No restrictions listed.

Storage: DO NOT store product in direct sunlight or above 35°C. Will not freeze even at extreme tempera- tures. If containers have been stored for several months, shake well before using. DO NOT store dry beans, peas, lentils, or soybeans treated with any *Vitaflo* product. Wheat, barley, rye, oats, triticale and flax seed treated with *Vitaflo 280/Vitaflo Fungicide/Vitaflo SP Fungicide* can be stored up to 18 months and treated corn seed can be stored up to one year without reduction in germination.

Environment: DO NOT contaminate ponds, lakes or streams.

Compatibility with rhizobia-based inoculants: *Vitaflo 280, Vitaflo Fungicide,* and *Vitaflo SP Fungicide* are compatible with rhizobia. Do not tank mix *Vitaflo 280, Vitaflo Fungicide,* or *Vitaflo SP Fungicide* and rhizobia. Always check with rhizobia manufacturers on any restrictions that may exist with seed treatments.

Hazard Rating:

◇ Warning – Eye Irritant

▽ Caution – Skin Irritant

For an explanation of the symbols used here see page 11.

Insect Control

Additional Resources

For additional information on monitoring, economic thresholds and biological control of insects in field crops, as well as information on insect management in commodities other than those covered in this guide see the WCCP Guide to Integrated Control of Plant Pests at:
http://www.westernforum.org/wccp%20guidelines.html

Insect Management Decisions

Crop rotations, cultivar selections, and seeding dates can be chosen to reduce the risk of injury from some insects that may be of higher risk to a crop. Management of insects with insecticides should only be considered when numbers or damage exceed economic thresholds. To select an insecticide, verify the registered products for the insect and field crop in the following tables. Consideration should then be given to the preharvest intervals, how the product will be applied, restrictions, precautions and the hazard rating.

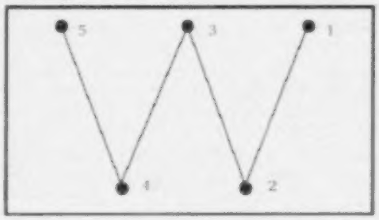
Preharvest Interval

The **preharvest interval** is the number of days that must pass between the last application of a pesticide and harvest. Harvest is the cutting of the crop or removal of the produce from the plant. It includes direct-combining, cutting (swathing) or grazing; it does not include swath-combining or baling for hay.

Field Scouting

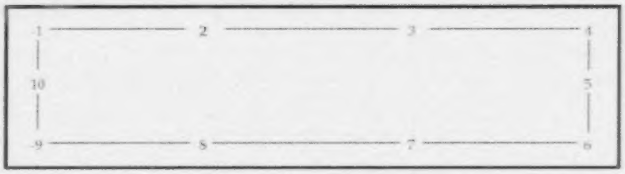
Field scouting is the regular examination of fields to accurately assess the kind and the number of insects, plant pathogens and weeds present and the amount of damage being done. Scouting should be done weekly during the growing season and more frequently when infestations approach economic levels or when weather conditions favour the rapid development of specific pests.

To properly scout for insect pests, you must know when they occur, where they live, what they look like, and how to find and count them. The number of locations to assess in a field will depend on the field size, and any specific pests that may be of concern. Generally a minimum of 5 sites should be sampled, however some insects may require more sites to be sampled to accurately make management decisions. There are several possible scouting patterns that can be used when checking fields. These options are based on pest distribution and field configuration.



Pattern 1: Used when pests are uniformly distributed.

This scouting pattern typically looks like an X, Z or W, excluding field edges. Pests that fit this pattern include aphids, bertha armyworm and diamondback moth.



Pattern 2: Used when pests are at the edges of fields.

Scout by walking along field edges, fence lines or ditches. Some examples of when you would include more focused scouting along field edges are to estimate early-season populations of flea beetles, Colorado potato beetles and grasshoppers.

In each area examined, use of a sweep net, if possible, is a good way to determine what potential pests and beneficial insects may be present. This should be followed by examining some plants and the soil surface. More specific counts of a particular type of insect or plant damage may be necessary if they are abundant during the more general scouting.

Economic Thresholds

Monitoring methods, typical symptoms and economic thresholds or nominal thresholds for the more common crop pests are described in the field scouting section for each commodity. The smallest number of insects (or level of injury) that cause damage equal to the pest management costs is called the **economic injury level.** The **economic threshold** is the density of insects (or level of injury) at which control measures should be applied to prevent an increasing population from reaching the economic injury level. Note that factors such as moisture, temperature conditions and stage of crop growth, can increase or decrease the impact of insects on crop production. In some instances, nominal thresholds are pre-sented; these decision guidelines are based on experience rather than research quantifying the impact of the insects on the crop.

Estimating Percent Defoliation

Many economic thresholds for insects are based on percent defoliation of the plants they are feeding on. The following figure may assist in determining the percent defoliation. Although the photo below is of sunflower leaves, this figure can be used to estimate % defoliation for many crops.

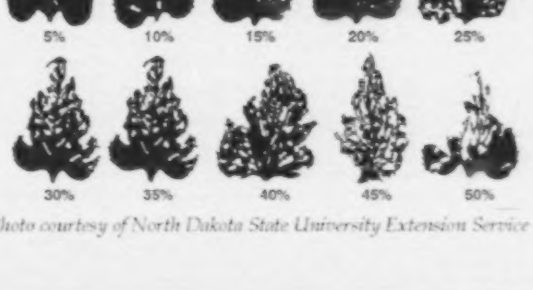


Photo courtesy of North Dakota State University Extension Service

Hazard Ratings of Insecticides to Bees

The following table indicates the maximum time required for the insecticides listed in the Guide to be degraded by weather to a low hazard level for bees. **These times are to be used as general guidelines only.** Most of these insecticides have not been tested for bee toxicity under Western Canadian conditions and environmental conditions influence the rate at which pesticides degrade.

INSECTICIDE	HAZARD RATING[a]		RESIDUE HAZARD (DAYS)[b]
	HONEY BEE	LEAFCUTTER BEE	
Least Hazardous Insecticides to Bees			
Dipel	3	3	none
Nolo Bait	3	3	none
Eco bran	3	3	N/A
Coragen	3	-	-
Beleaf	3	-	<1
Moderately to Highly Hazardous to Bees			
Fulfill	2-3	2	<1
Assail	1-2	-	<1
Decis	1-2	1-2	<1 - 1
Rimon	1-2	2	1
Lannate	1-2	1-2	<1 - 1.5
Success / Entrust	1-2	1	<1 - >1
Admire/Alias/ Grapple	1	1-2	<1 - >1
Matador/Silencer	1	1	>1
Oberon	1-2	1	-
Delegate	1-2	1	-
Movento	1	-	-
Agri-mek	1-3	2	<1 - 3
Thionex	1-2	1	<1 - 3
Orthene	1	1	2.5 - 3
Mako/UP-Cyde	1	1	<1 - >3
Dibrom	1-2	1-2	<1 - 4.5
Ambush/Pounce/Perm-UP	1	1	<1 - 5
Malathion	1-2	1	2 (Honey Bee), 6 (Leafcutter Bee)
Lorsban/Pyrinex/Nufos/ Citadel/ Warhawk/MPOWER Krypton	1	1	2-6
Sevin	1-2	1-2	<1 - 7
Cygon/Lagon	1	1	3 - 7

[a] **HAZARD RATING** 1 = Very poisonous to bees; do not apply to crops or weeds in bloom unless bees are kept off for the period that residue on the crop is a hazard. 2 = Moderately poisonous to bees; avoid direct application to bees, but may be applied with minimum hazard in late evening when bees are not foraging. 3 = Not very poisonous to bees; may be applied with minimum hazard to bees.

[b] Residue hazard represents the average time in days that residues poisonous to honey bees will remain on foliage (may vary with formulation and weather). Unusually low temperatures following spray application may cause residues to remain toxic longer than under warmer conditions. Morning dew can also make residues more toxic to foraging bees.

A more extensive list of hazard ratings of insecticides to bees and duration of toxicity can be found at the Western Committee on Crop Pests website at: http://www.westernforum.org/WCCP%20Guidelines.html

Reducing Bee Losses from Insecticides

Careless use of insecticides can kill bees and other beneficial insects such as pollinators, predatory and parasitic biological control insects. Help to reduce insecticide poisoning of bees by:

1. **Avoid applying insecticides that are toxic to bees on crops in bloom.** Any field with even a small amount of bloom, whether it is the main crop, cover crop, or weeds will probably have foraging bees visiting the flowers. If at all possible, apply insecticides before or after the crop has gone into bloom. Control all flowering weeds prior to insecticide application.
2. **Apply insecticides when bees are least active.** The highest level of bee activity occurs during the day. Apply insecticides in late evening or early morning when the bees are not foraging. As a general rule, evening applications are less hazardous to bees than morning applications.
3. **Avoid insecticide drift.** To avoid insecticides drifting into non-target locations, do not apply insecticides during windy conditions. Choose nozzles with a low drift rating. As a general rule, ground applications of insecticide are less prone to drift than aerial applications.
4. **Contact the beekeeper before spraying.** Communication and cooperation between the insecticide applicator and the beekeeper can usually prevent bee losses. Notifying the beekeeper in advance (i.e. 48 hours) of applying insecticides will allow the beekeeper to move or protect the colonies from insecticide damage.
5. **If possible, use insecticides and/or insecticide formulations which are the least hazardous to bees.** The following table "Hazard Ratings of Insecticides to Bees" will help in selecting the least hazardous insecticide. In general, dusts are more hazardous to bees than sprays. Wettable powders are more hazardous than emulsifiable concentrates (EC) or water-soluble formulations. Granular insecticides and spreadable bran bait insecticides are generally the least hazardous to bees.

Insecticide Poisoning in Humans

Organophosphate (OP) and carbamate insecticides (identified on the Insecticide Groups chart page 493) can pose a serious risk to unprotected persons. Poisonings can occur while mixing, loading and/or during the application of these products without the appropriate protective equipment or measures. These pesticides are readily absorbed through the skin or the lungs, and can act as nervous system toxins. Overexposure can produce symptoms such as headache, nausea, pupil dilation and excessive sweating and salivation. Higher doses may cause breathing difficulties, muscle twitching, weakness and spasms. Very high doses have caused respiratory failure and death.

Both OP and carbamate pesticides inhibit an enzyme called cholinesterase. Measurements of cholinesterase in the blood before and during the application season can indicate harmful exposures to OPs and carbamates. **Persons who intend to mix, load and/or apply these types of pesticides repeatedly during a season, need a baseline and repeat measurements. Consult your doctor before the spraying season to arrange for these measurements.**

Degree of Risk and Hazard Rating:

(see page 11 for full description)

Resistance of Insects to Insecticides

Repeated use of the same insecticide, or insecticides with the same mode of action, against a particular insect in a given area may result in the effectiveness of the insecticide being reduced.

To delay or prevent resistance of insects to insecticides:

1. Integrate different control methods (cultural, biological, chemical) into insect control programs whenever possible,
2. Use insecticides only when the economic threshold for a pest has been surpassed and natural controls fail to limit economic damage,
3. Rotate between insecticides with different modes of action, particularly if several applications are made in a season, and
4. Keep accurate records of insecticides used for each of your fields.

Insecticides can be classified according to their similarity in chemical structure (chemical group in the table below), and by mode of action (the process by which the insecticide kills the insect). The "Group" column in the following table separates insecticides based on their mode of action. By selecting products with different modes of action for an insecticide rotation program, risk of insecticide resistance can be reduced.

Insecticide Groups Based on Modes of Action

GROUP	CHEMICAL GROUP	TRADE NAME	ACTIVE INGREDIENT	MODE OF ENTRY
1A	Carbamates	Sevin Eco Bran	carbaryl	contact/ ingestion (Sevin) ingestion (Eco Bran)
		Lannate	methomyl	contact/ ingestion
1B	Organophosphates	Malathion	malathion	contact
		Orthene	acephate	contact/ ingestion
		Dibrom	naled	contact/ ingestion
		Imidan	phosmet	
		Lorsban, Pyrinex, Nufos, Citadel, Warhawk, MPOWER Krypton, Pyrifos	chlorpyrifos	contact/ ingestion/ inhalation
		Lagon, Cygon	dimethoate	contact/ ingestion
		Thimet 20-G	phorate	ingestion
2A	Cyclodiene organochlorines	Thionex	endosulfan	contact/ ingestion
3A	Pyrethroids	Decis	deltamethrin	contact/ ingestion
		Mako, UP-Cyde	cypermethrin	contact/ ingestion
		Matador, Silencer	lambda-cyhalothrin	contact/ ingestion
		Ambush, Pounce, Perm-UP	permethrin	contact/ ingestion
		Capture	bifenthrin	
		Tempo	cyfluthrin	
4A	Neonicotinoids	Helix, Cruiser Actara 240SC Actara 25WG	thiamethoxam	ingestion ingestion contact/ ingestion
		Admire, Alias, Grapple, Gaucho, Raxil ProShield, Sombrero, Stress Shield 600	imidacloprid	contact/ ingestion (flowable formulations) ingestion (seed treatments)
		Assail	acetamiprid	contact/ ingestion
		Prosper, Poncho, Nipsit, Titan, Clutch	clothianidin	ingestion
4C	Sulfoxaflor	Closer	sulfoxaflor	
5	Spinosyns	Success, Entrust	spinosad	contact/ ingestion
		Delegate	spinetoram	contact/ ingestion
6	Avermectins, Milbemycins	Agri-mek	abamectin	contact/ ingestion
9B	Selective homopteran feeding blockers	Fulfill	pymetrozine	ingestion mainly, some contact activity
9C		Beleaf	flonicamid	contact/ ingestion
11	Microbial disruptors of insect midgut membranes	Dipel	*Bacillus thuringiensis var. Kurstaki*	ingestion
15	Benzoylureas	Rimon	novaluron	ingestion/ contact
23	Tetronic and tetramic acid derivatives	Movento	spirotetramat	
		Oberon	spiromesifen	contact
24A		Phostoxin	aluminum phosphide	inhalation (fumigant)
28	Diamides	Coragen	chlorantraniliprole	ingestion/ contact
		Lumiderm, Verimark, Fortenza	cyantraniliprole	ingestion

A more detailed table showing insecticides organized by mode (site) of action, and specific information on the mode (site) of action for the different groups can be found on the Insecticide Resistance Action Committee website at: http://www.irac-online.org/documents/moa-classification/?ext=pdf

Field Scouting in Alfalfa

SAP OR FLUID FEEDERS

Lygus bugs/Alfalfa plant bug

Typical Damage: Field blooms poorly or not at all. Flower buds blasted, whitish, and dry; flowers dropping off before fully open. Collapsed seed.

When and How to Monitor: Look for plant bugs when monitoring alfalfa in June through mid-August. Make five 180° sweeps with a 15-inch (40 cm) insect net through alfalfa canopy at each sampling site. Record total number of plant and lygus bugs (both nymphs and adults) captured. Calculate average number per sweep.

Economic Threshold: Hay: Control not recommended. Seed alfalfa at bud and early bloom: 8 lygus bugs/sweep; 4 alfalfa plant bugs/sweep; or 5 bugs if the plant bug population is a combination of lygus bugs and alfalfa plant bug. If insecticides are used, attempt to spray before the onset of bloom. Protecting insect pollinators in seed production fields is very important.

Potato Leafhopper

Leafhoppers are most severe in new seedings and in regrowth under hot dry weather.

When and How to Monitor: Take 20 180° sweeps from 5 areas of the field. Avoid field edges. Determine the average number of potato leafhoppers per sweep.

Economic Threshold: For 9 cm stem height = 0.2 adult leafhoppers per sweep; 15 cm stem height = 0.5 adults per sweep; 25 cm stem height = 1 adult or nymph per sweep; 36 cm stem height = 2 adults or nymphs per sweep.

Pea Aphid

Typical Damage: Suck juices from plants; stunt growth; cause premature drying.

When and How to Monitor: Look for when monitoring in July through August. Take 5 sweeps at each location. Monitor fields closely during periods of slow plant growth.

Economic Threshold: 100-200 aphids/180° sweep when crop is moisture stressed, or until mid-August.

DEFOLIATORS

Alfalfa Weevil

Typical Damage: Feed on developing buds and leaves. Stunt growth.

When and How to Monitor: Start scouting fields in mid-May. Look for shot holes initially, then clipping along the edges of leaves and pinhole damage. For determining if levels are at threshold in hay crops, collect 30 stems in an M-shaped pattern, place them inside a white pail and beat them against the side to knock off larvae. Do not include younger first and second instar larvae (3 mm or less) in the counts. Determine the average height of the crop as well.

Economic Threshold: Alfalfa Hay: One of the best control strategies is to cut fields for hay early. If early cutting of the hay crop is not possible, treatment thresholds are based on the following measurements of plant height and levels of larvae: <30 cm – 1 larva/stem; <40 cm – 2 larvae/stem; 3 larvae per stem requires immediate action regardless of height of crop. On regrowth for second crop, 2 or more active larvae per crown (4 to 8 larvae/ft^2) will require insecticide application.

Alfalfa Seed: 20 to 30 3rd or 4th instar larvae/sweep (90° = straight sweep) or 35 to 50% of foliage tips showing damage. In some instances it may be practical to just treat hotspots and not entire fields.

Alfalfa Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Sap or Fluid Feeders					
Lygus bugs	Assail (seed production only) (N)	35-69 g	1	G	1,064
	Matador /Silencer (P)	34 ml	Do not apply within 3 days of livestock foraging.	A or G (Matador) G (Silencer)	64-110
	Decis 5EC (seed production only) (P)	80-100 ml	20	G	395
	Malathion 500 (OP)	0.80-1.21 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Dibrom (OP)	0.42-0.85 L	4	A or G	345

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Lygus bugs *continued*	Cygon 480 EC / Cygon 480-AG (OP) (seed and forage production)	0.17 L	2	A or G	60-450
	Lagon / Cygon 480 EC / Cygon 480-AG (OP) (seed production only)	0.44 L	28	A or G	60-450
Alfalfa plant bug	Assail (seed production only) (N)	35-69 g	1	G	1,064
	Cygon 480 EC (OP) (seed and forage production)	0.17 L	2	A or G	60-450
	Lagon / Cygon 480 EC / Cygon 480-AG (OP) (seed production only)	0.44 L	28	A or G	60-450
Potato leafhopper	Matador / Silencer (P)	34 ml	Do not apply within 3 days of livestock foraging.	A or G (Matador) G (Silencer)	64-110
	Sevin XLR Plus (C)	1.01-1.6 L	2	A or G	649
	Malathion 500 (OP)	0.80-1.21 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Dibrom (OP)	0.42-0.85 L	4	A or G	345
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.17 L	2	A or G	60-450
Spittlebugs	Malathion 85E (OP) (adults)	0.445 – 0.544 L	7	A or G	5,500
Pea Aphid	Beleaf (seed production only) (HFB)	49 – 65 g		G	
	Matador / Silencer (P)	34 ml	Do not apply within 3 days of livestock foraging.	A or G Matador) G (Silencer)	64-110
	Malathion 500 (OP)	0.80-1.21 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Dibrom (OP)	0.42-0.85 L	4	A or G	345
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.17 L	2	A or G	60-450
Spider mites	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Oberon	0.202 – 0.405 L		A or G	>2,000
Defoliators					
Grasshoppers	**Spreadable Bran Baits**				
	Nolo Bait (M)	Minimum of 0.45 kg		A or G	
	Eco bran (C)	0.8-1.6 kg	2	G	N/A
	Sprays				
	Matador / Silencer (P)	25-34 ml (Ground) 34 ml (Aerial)	Do not apply within 3 days of livestock foraging.	A or G	64-110

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Grasshoppers *continued*	Sevin XLR Plus (C)	0.50-1.01 L	2	A or G	649
	Malathion 500 (OP)	0.80-1.21 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.22 L (nymphs) 0.34-0.36 L (adults)	2-7 (Lagon, Cygon 480 EC) 28 (Cygon 480-AG)	A or G	60-450
Alfalfa weevil	If alfalfa has reached the bud or early bloom stage, immediate **cutting** will kill many alfalfa weevil larvae				
	Coragen (D) (suppression only)	152-202 ml	0	G	>5,000
	Matador / Silencer (P)	34 ml	Do not apply within 3 days of livestock foraging.	A or G (Matador) G (Silencer)	64-110
	Decis 5EC (seed crops only) (P)	80 – 100 ml	20	G	395
	Malathion 500 (OP)	0.80-1.21 L	7	A or G	4302
	Malathion 85E (larvae only) (OP)	0.445-0.544 L	7	A or G	5,500
	Imidan (OP)	0.65 kg	7	G	285
	Lagon / Cygon 480 EC / Cygon 480-AG (OP) (reduction only)	0.17 L	2	A or G	60-450
Blister beetles	Sevin XLR Plus (C)	1.01-1.6 L	2	A or G	649
Armyworm	Sevin XLR Plus (C)	1.01-2.12 L	2	A or G	649
Beet webworm	Sevin XLR Plus (C)	1.01-2.12 L	2	A or G	649
Alfalfa looper	Dibrom (OP)	0.42-0.85 L	4	A or G	345
Alfalfa Caterpillar	Sevin XLR Plus (C)	1.01-2.12L	2	A or G	649
Leafminers					
Alfalfa blotch leafminer	Malathion 85E (OP)	0.544 L	7	A or G	5,500
	Imidan (OP)	0.65 kg	7	G	285
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.22 L	2	A or G	60-450

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: M=microbials, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

[2] LD$_{50}$ values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD$_{50}$

Barley-See Small Grain Cereals

Scouting for insects in Beans (Dry Edible Beans)

BELOWGROUND FEEDERS AND CUTWORMS

Seedcorn Maggot

Typical Damage: Seedcorn maggot attacks bean seed, preventing sprouting or weakening seedlings. The yellowish white maggot is found burrowing in the seeds or emerging stem. Seedcorn maggots are usually most severe in wet, cold seasons and on high organic matter soils.

Cutworms

When and How to Monitor: To find cutworms, dig in the soil to a depth of 2.5 to 5 cm at the base of recently damaged plants.

Nominal Threshold: Treatment is warranted when one cutworm or more is found per metre of row and the larvae are still small (less than 2 cm long).

SAP FEEDERS

Leafhoppers

Typical Damage: Foliage becomes dwarfed, crinkled, and curled. Small triangular brown areas appear at the tips of leaves, gradually spreading around the entire leaf margin.

When and How to Monitor: Leafhopper adults are quick and can be observed by running your hand over the top of the plants as you approach them and observing adults that fly off the plants. On the same plants, turn over each leaf to determine the number of nymphs per trifoliate.

Economic Threshold: Unifoliate stage – 0.25 leafhoppers per trifoliate; second trifoliate stage – 0.5 leafhoppers per trifoliate; fourth trifoliate stage – 1.0 leafhopper per trifoliate; first bloom-2.0 leafhoppers per trifoliate.

DEFOLIATORS

Grasshoppers

Economic Threshold: Substantial yield loss does not occur until up to 35% defoliation occurs before bloom and 15% after bloom.

Beans (Dry Edible) Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Vibrance Beans (N)	A seed treatment combining Cruiser Maxx Beans and Vibrance 500FS			
	Cruiser 5FS (N)	83 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
	Stress Shield 600 (N)	Seed Treatment			
Seedcorn Maggot	Sow seeds as shallow as possible in a warm, well-prepared seedbed. If manure is used, apply and plow it under the previous fall.				
	Cruiser Maxx Vibrance Beans (N)	A seed treatment combining Cruiser Maxx Beans and Vibrance 500FS			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Sap or Fluid Feeders					
Lygus Bugs	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Sevin XLR Plus (C)	2.12-2.59 L	5	A or G	649
	Cygon 480-AG (OP)	0.28-0.40 L	7	A or G	60-450

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Potato Leafhopper	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Sevin XLR Plus (C)	1.01 L	5	A or G	649
	Cygon 480-AG (OP)	0.28-0.40 L	7	A or G	60-450
Aphids	Movento	75 - 111 ml	7	G	>2,000
	Matador (P)	34 – 94 ml	14	A or G	64-110
	Malathion 500 (OP)	0.56-1.21 L	1	A or G	4302
	Malathion 85E (OP)	0.297-0.544 L	3	G	5,500
	Dibrom (OP)	0.42-0.85 L	4	A or G	345
	Cygon 480-AG (OP)	0.28-0.40 L	7	A or G	60-450
Defoliators and Borers					
Grasshoppers	**Spreadable Bran Baits**				
	Eco bran (C)	0.8-1.6 kg	5	G	N/A
	Sprays				
	Coragen (D)	51 – 101 ml	1	A or G	>5,000
European Corn Borer	Coragen (D)	101-152 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14	A or G	98
Variegated Cutworm	Sevin XLR Plus (C)	30-35 mL/100 m of row	5	A or G	649
Alfalfa looper	Dibrom (OP)	0.42-0.85 L	4	A or G	345

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: D=diamides, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

[2] LD$_{50}$ values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD$_{50}$.

Buckwheat Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
Defoliators					
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: D=diamides

[2] LD$_{50}$ values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD$_{50}$.

Scouting for insects in Canaryseed

APHIDS

When and How to Monitor: Start checking for aphids when monitoring during the early heading stage of canaryseed. The head should be bent and closely inspected for aphids hiding along the small stem inside the canaryseed head. Also check the stems, underside of leaves, and in the canaryseed boot.

Nominal Threshold: 10 to 20 aphids on 50% of the stems prior to the soft dough stage.

Canaryseed Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Sap Feeders					
Aphids	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.20 L	21	A or G	60-450
	Malathion 85E (OP)	0.277 L	14	A or G	5,500

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: OP=organophosphates

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Canola

Scouting Calendar

Early-season: Flea beetles, cutworms, red turnip beetle, diamondback moth

Mid-season: Diamondback moth, cabbage seedpod weevil, grasshoppers

Late season: Bertha armyworm, diamondback moth, Lygus bugs, grasshoppers, alfalfa looper

Cutworms

Typical Damage: Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.

When and How to Monitor: Look for cutworms, and evidence of cutworm feeding, when monitoring canola in late May to mid-July. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworms will sometimes be most abundant in patches or a specific area of a field.

Nominal Threshold: 25-30% stand reduction. Sometimes it is most economical to just treat infested patches, and not whole fields.

SAP OR FLUID FEEDERS:

Lygus Bugs

Typical Damage: Attacked buds appear shrunken and bleached white. Damaged seeds appear dark brown and shriveled.

When and How to Monitor: Monitor from when flowering is complete until seeds within the pod have become firm. Make 10 sweeps with a 38 cm diameter insect net at each of at least 5 sampling site. If while doing these samples populations appear to be of concern, take additional samples; a minimum of 15 samples is needed to accurately determine whether controls are economical. Sample canola for lygus bugs on a sunny day when the temperature is above 20°C and the crop canopy is dry.

Economic Threshold: 10-18 lygus bugs/10 sweeps from when flowering is complete and seeds are enlarging in the lower pods to when seeds in the lower pods are full size and translucent; and 15-25 lygus bugs/10 sweeps when seeds in the lower pods are green. Controls are not recommended when seeds are ripening (yellow or brown). When precipitation is greater than 100 mm from the onset of bud formation to the end of flowering, the crop may partially compensate for plant bug damage.

A table of specific economic thresholds for various expected values of canola seed and costs of control for lygus bugs in canola can be found at: http://www.gov.mb.ca/agriculture/crops/insects/fad12s00.html

Aphids

Economic Threshold: Control aphids in canola if densities exceed 25 aphids/10 cm shoot tip after flowering.

DEFOLIATORS:

Flea beetles

Typical Damage: Shot-holes in leaves to complete destruction of seedling plants in late May through June. Holes chewed in pods in August (occasional).

When and How to Monitor: Look for when monitoring in May through June when crop is in seedling stage. Examine 10 plants at random at each stop. Estimate overall percentage leaf loss.

Economic Threshold: When 25 percent of leaf surface is destroyed and flea beetles are present. If damage is only along the field margins and beetles are still congregated there, then control measures should be applied to the damaged areas only.

Diamondback moth

Typical Damage: Flowers clipped or chewed, outer layers of stem and pods chewed, holes chewed in pods.

When and How to Monitor: Look for when monitoring in late – May through early September. Observing for adults and larvae while taking sweep net samples can determine the presence and relative abundance of diamondback moth in the field. If levels appear to be of concern, shake plants within a 50 cm x 50 cm area and count larvae on the ground or surface (such as a sweep net) that plants were shaken over. Another alternative is to clip or pull the plants and knock over a light colored surface (such as a sweep net, jacket, hood of a car, etc.). Multiply by 4 to get the number of larvae per square metre. Do this in at least 5 areas of the field.

Nominal Threshold: 100 to 150 larvae/m^2 in immature to flowering plants. 200 to 300 larvae/m^2 in plants with flowers and pods. Note that these threshold numbers are based on stands averaging 150-200 plants/m^2. In areas where stands are thinner, the economic threshold should be lowered accordingly. A nominal threshold of 25-33% defoliation with larvae still present can be applied for canola at seedling stage.

Bertha Armyworm

Typical Damage: Outer layers of stems and pods chewed resulting in whitish appearance, holes chewed in pods.

When and How to Monitor: Look for larvae when monitoring fields in late July through early August. At each stop, shake plants in a 1/4 m^2 (50 cm x 50 cm) area and carefully check soil surface for dislodged larvae. During heat of the day larvae will often be found under leaves on soil surface.

Economic Threshold: A loss of 0.058 bushels/acre for each larva/m^2 can be expected. Multiplying 0.058 X average number of larvae per m^2 X expected seed value (dollars/acre) will determine the economic loss (in dollars/acre) due to the larvae. Only if control costs (insecticide plus application costs) can be applied for less than this economic loss will insecticide applications be economical. Yield loss may be greater for canola under moisture stress.

At an expected seed value of $6.00/bushel, the economic threshold will be between about 20 and 34 larvae/m^2, depending on control costs. At an expected seed value of

$8/bushel, the economic threshold will be between about 15 and 26 larvae/m^2, depending on control costs. Tables showing specific economic thresholds at various expected seed values and control costs can be found at: http://www.gov.mb.ca/agriculture/crops/insects/fad03s01.html

Canola Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Root maggots	• **Increased seeding rates and increased row spacing** (to about 25 to 30 cm) can reduce damage to the roots by root maggots. • **Cultivating** prior to seeding reduces adult emergence from overwintered pupae. Root maggot infestations are greater under zero-till systems than under conventional tillage, but yields under zero tillage usually still exceed those with conventional tillage.				
Cutworms	**Seed Treatments**				
	Fortenza + Helix Vibrance	Seed Treatment			
	Prosper EverGol + Lumiderm	Seed Treatment			
	Helix Vibrance + Lumiderm	Seed Treatment			
	Foliar Sprays				
	Coragen (D)	101 ml	1	A or G	>5,000
	Matador (P)	34 ml	7	A or G	64-110
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6-leaf stage	G	1276
	Chlorpyrifos (OP)	0.354-0.486 L	21	A or G	205-418
Sap and Fluid Feeders					
Lygus Bugs	Decis 5EC (P)	60 ml	7	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Chlorpyrifos (OP)	0.202 - 0.405 L	21	A or G	205-418
Turnip aphid	Lagon /Cygon 480-AG (OP)	0.34-0.36 L	21	A or G	60-450
Aster leafhopper	Lagon /Cygon 480-AG (OP)	0.34-0.36 L	21	A or G	60-450
Swede midge	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	7	A or G	64-110
Defoliators					
Crucifer Flea beetle and/ or striped flea beetle	**Seed Treatments**				
	Fortenza + Helix Vibrance	Seed Treatment			
	Helix Vibrance (N)	A seed treatment containing Helix Xtra and Vibrance 500FS			
	Helix Vibrance + Lumiderm	Seed Treatment			
	Prosper EverGol (N)	Seed Treatment			N/A
	Prosper EverGol + Lumiderm	Seed Treatment			
	Nipsit Inside (N)	250 – 666 ml / 100 kg seed	Seed Treatment		3,044
	Gaucho Canola System (N)	0.833 L/ 100 kg of seed	Seed Treatment		N/A
	Gaucho Platinum (N)	1.667L/100 kg of seed	Seed Treatment		N/A
	Sombrero (N)	0.67 – 1.33 L / 100 kg seed	Seed Treatment		N/A

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Crucifer Flea beetle and/ or striped flea beetle *continued*	**Foliar Sprays**				
	Decis 5EC (P)	40 -60 ml	7	A or G	395
	Mako (P)	20 ml	30	G	242-542
	UP-Cyde (P)	56.6 ml	30	A or G	355
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Pounce (P) Ambush (P)	36-73 ml 28-57 ml		A or G	1276
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Sevin XLR Plus (C)	0.2 L	Seedling application only	A or G	649
	Malathion 500 (OP)	0.4 L	7	A or G	4302
	Malathion 85E (OP)	0.217-0.346 L	7	A or G	5,500
Cabbage seedpod weevil	Trap crops of earlier-flowering canola can be used to concentrate cabbage seedpod weevils, which can be managed with an insecticide if needed.				
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Decis 5EC (for control of adults only) (P)	80 ml	7	A or G	395
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Diamondback moth	Coragen (D)	51 ml	1	A or G	>5,000
	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 500 (OP)	0.22-0.34 L	7	A or G	4302
	Malathion 85E (OP)	0.109-0.168 L	7	A or G	5,500
	Chlorpyrifos (OP)	0.405 -0.607L	21	A or G	205-418
Bertha Armyworm	**Seeding as early as possible** and choosing **early maturing varieties of canola** may help minimize damage in years when outbreaks are forecasted.				
	Coragen (D)	51 - 152 ml	1	A or G	>5,000
	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Mako (P)	28 ml (ground) 36 ml (air)	30	A or G	242-542
	UP-Cyde (P)	81 – 113 ml	30	A or G	355
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Lannate (C)	87.4 – 206.4 g	8	A or G	30-34
	Chlorpyrifos (OP)	0.304-0.405 L	21	A or G	205-418

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Alfalfa looper	Lannate (C)	87 – 206 g	8	A or G	30-34
	Chlorpyrifos (OP)	0.304-0.405 L	21	A or G	205-418
Beet webworm	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Lannate (C)	87.4 – 206.4 g	8	A or G	30-34
Clover cutworm	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Lannate (C)	87.4 - 206.4 g	8	A or G	30-34
True armyworm	Chlorpyrifos (OP)	0.304-0.405 L	21	A or G	205-418
Imported Cabbageworm	Coragen (D)	101 ml	1	A or G	>5,000
	Matador / Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Variegated cutworm	Chlorpyrifos (OP)	0.354-0.486	21	A or G	205-418
Grasshoppers	**Spreadable Bran Baits**				
	Eco bran (C)	0.8-1.6 kg	Treat only seedlings	G	N/A
	Sprays				
	Decis 5EC (P)	40 – 60 ml (Ground); 60 ml (Aerial)	7	A or G	395
	Matador / Silencer (young grasshoppers only) (P)	25 – 34 ml (Ground) 34 ml (Aerial)	7	A or G	64-110
	Mako (P) (young grasshoppers only)	20 – 28 ml	30	G	242-542
	UP-Cyde (P) (young grasshoppers only)	33 – 46 ml			355
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 500 (OP)	0.45-0.69 L	7	A or G	4302
	Malathion 85E (OP)	0.217-0.346 L	7	A or G	5,500
	Chlorpyrifos (OP)	0.235-0.354 L	21	A or G	205-418
	Lagon / Cygon 480-AG / Cygon 480 EC (OP)	0.34-0.36 L	21	A or G	60-450
Slugs	Sluggo Professional	10-20 kg		G	>5,000

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

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[1] Insecticide Group: D=diamides, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Chickpeas Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Pulses (N)	A seed treatment containing Cruiser 5FS and Apron Maxx RFC			
	Cruiser 5FS (N)	17-50 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
	Stress Shield 600 (N)	Seed Treatment			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Sap Feeders					
Pea Aphid	Movento	75 - 111 ml	7	G	>2,000
	Matador /Silencer (P)	34 – 94 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14	A or G	98
Potato Leafhopper	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Defoliators					
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: D=diamides, P=pyrethroids, N=neonicotinoids.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Corn (Field Corn)

Cutworms

Typical Damage: Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.

When and How to Monitor: Look for cutworms, and evidence of cutworm feeding, when monitoring corn in late – May to mid-July. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworms will sometimes be most abundant in patches or a specific area of a field. At each stop, examine 100 plants in a row. Calculate percentage of plants cut off or showing leaf feeding.

Economic Threshold: When 3-6% of plants are cut and small larvae less than 1 inch present. Sometimes it is most economical to just treat infested patches, and not whole fields.

European corn borer

Typical Damage: Shot-holes in leaves. Holes in stalk, tassels and ears. Damage may cause stalk breakage prior to harvest or cobs to fall to the ground. Nutrient flow in the plant may be restricted, resulting in smaller cobs.

When and How to Monitor: Begin looking for European corn borer when field scouting in early July. At 5 locations, examine 10 plants for young larvae and egg masses. Calculate percentage of plants infested. Scout every 5 to 7 days until the end of July or larvae start to tunnel into the stalks.

Economic Threshold: The level of European corn borer where control becomes economical depends on the value of the crop, and cost of control. Information on determining specific economic thresholds for European corn borer in corn can be found at http://www.gov.mb.ca/agriculture/crops/insects/european-corn-borer.html, or from your local agriculture office. These thresholds are based on a 5% yield loss per corn borer per plant on average. If the majority of larvae have bored into the stalk, do not apply insecticide, as they are ineffective once the larvae have entered the stalk.

Corn (Field Corn) Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Cutworms	**Seed Treatments**				
	Fortenza (D)	83 - 167 ml / 100 kg seed			
	Foliar Sprays				
	Matador /Silencer (P)	34 ml	14	A or G	64-110
	Mako (P) UP-Cyde (P)	71 ml 115 ml	21	G	242-542 355
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6 leaf stage	G	1030
	Chlorpyrifos (darksided, black, redbacked) (OP)	0.971 L (Pre-plant treatment), 0.486-0.971 L (seedling treatment)	70	G	205-418
	Pyrifos 15G (OP)	75 g per / 100 m of row	70	G	2250
Wireworms	Fortenza (D)	Seed Treatment			
	Cruiser Maxx Corn (N)	83 ml Cruiser 5FS / 100 kg seed	Seed Treatment	Seed Treatment	>5,000
	Poncho 600 FS (N)	33.3-66.6 ml of Poncho 600 per 80,000 unit of seed	Seed Treatment	Seed Treatment	2,000
	Nipsit Inside (N)	33.3-66.6 ml per 80,000 unit of seed	Seed Treatment	Seed Treatment	3,044
	Sombrero (N)	0.16 mg per kernel	Seed Treatment	Seed Treatment	N/A
Seedcorn maggot	Cruiser Maxx Corn (N)	83-166 ml Cruiser 5FS / 100 kg seed	Seed Treatment	Seed Treatment	>5,000
	Poncho 600 FS (N)	33.3-66.6 ml of Poncho 600 per 80,000 unit of seed	Seed Treatment	Seed Treatment	2,000
	Nipsit Inside (N)	33.3-66.6 ml per 80,000 unit of seed	Seed Treatment	Seed Treatment	3,044
Corn rootworm	**Crop rotation** is an effective management strategy				
	Resistant Cultivars: Some cultivars of Bt corn are resistant to feeding by corn rootworm. A table of registered Bt corn products in Canada (as of April 2015) is available at: http://www.cornpest.ca/index.cfm/bt-corn/registered-bt-hybrids/				
	Cruiser Maxx Corn (N)	830 ml Cruiser 5FS / 100 kg seed	Seed Treatment	Seed Treatment	>5,000
	Poncho 600 FS (N)	166.7 ml of Poncho 600 per 80,000 unit of seed	Seed Treatment	Seed Treatment	2,000
	Nipsit Inside (N)	166.7 ml per 80,000 unit of seed	Seed Treatment	Seed Treatment	3,044
	Pyrifos 15G (OP)	75 g per / 100 m of row	70	G	2250

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Sap Feeders					
Spider mites	Oberon	162-243 ml	Green forage – 5 Grain or stover – 30	A or G	>2,000
Defoliators and Borers					
Grasshoppers	**Spreadable Bran Baits**				
	Eco bran (C)	0.8-1.6 kg	1	G	N/A
	Sprays				
	Sevin XLR Plus (C)	0.50-1.01 L	1	A or G	649
European Corn Borer	**Stalk Management:** Primary tillage such as chisel plowing or moldboard plowing in the fall can reduce overwintering populations. Mowing corn stalks after harvest can reduce overwintering populations up to 85%. **Resistant Cultivars:** Some cultivars of Bt corn are resistant to feeding by European corn borer. A table of registered Bt corn products in Canada (as of April 2015) is available at: http://www.cornpest.ca/index.cfm/bt-corn/registered-bt-hybrids/				
	Dipel 2X DF (M)	0.23-0.45 kg	0	G	>4,000
	Coragen (D)	101 – 152 ml	14	G	>5,000
	Matador/ Silencer (P)	34-76 ml	14 (silage) 21 (field corn)	A or G	64-110
	Decis 5EC (P)	0.1-0.12 L	N/A	G	395
	Mako (P)	71 ml	5	A or G	242-542
	UP-Cyde (P)	113 ml	5	A or G	355
	Voliam Xpress (D+P)	202 ml	14 (silage) 21 (field corn)	A or G	98
	Sevin XLR Plus (C)	1.01-1.6 L	1	A or G	649
	Malathion 85E (OP)	0.445-0.544 L	5	A or G	5,500
Corn Earworm	Some cultivars of Bt corn are resistant to feeding by corn earworm.				
	Coragen (D)	101 – 152 ml	14	G	>5,000
	Matador/ Silencer (P)	34-76 ml	14 (silage) 21 (field corn)	A or G	64-110
	Mako (P) UP-Cyde (P)	71 ml 113 ml	5	A or G, see product label	242-542 355
	Voliam Xpress (D+P)	202 ml	14 (silage) 21 (field corn)	A or G	98
	Sevin XLR Plus (C)	1.01-1.6 L	1	A or G	649
	Malathion 85E (OP)	0.445-0.544 L	5	A or G	5,500
Armyworm	Coragen (D)	101 – 152 ml	14	G	>5,000
	Matador /Silencer (P)	34 ml	14 (silage) 21 (field corn)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14 (silage) 21 (field corn)	A or G	98

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Fall armyworm	Some cultivars of Bt corn are resistant to feeding by fall armyworm.				
	Coragen (D)	101 – 152 ml	14	G	>5,000
	Matador/Silencer (P)	34 ml	14	A or G	64-110
	Pounce (P)	73 ml	1	G	1030
	Sevin XLR Plus (C)	1.01-1.6 L	1	A or G	649

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[1] Insecticide Group: M=microbials, D=diamides, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates

[2] LD$_{50}$ values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD$_{50}$.

Fababean Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground Feeders					
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
Wireworms	Cruiser Maxx Pulses (N)	A seed treatment containing Cruiser 5FS and Apron Maxx RFC			
	Cruiser 5FS (N)	17-50 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
	Stress Shield 600 (N)	104 ml / 100 kg seed	Seed Treatment		
Pea Leaf Weevil	Stress Shield 600 (N)	104 ml / 100 kg seed	Seed Treatment		
Sap and Fluid Feeders					
Lygus Bugs	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Potato Leafhopper	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Pea Aphid	Matador /Silencer (P)	34 - 94 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14	A or G	98
Defoliators					
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000

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Field Scouting in Flax

Cutworms

Typical Damage: Notched, wilted, dead, or cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.

When and How to Monitor: Look for cutworms, and evidence of cutworm feeding, when monitoring in late May to mid-July. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworms will sometimes be most abundant in patches or a specific area of a field. In areas of the field where cutworm damage is noticeable, check around damaged plants in a 0.25 m^2 (50cm x 50cm) area. Use trowel or shovel to carefully search through top 5 cm of soil for cutworm larvae. Multiply the number of cutworms found by 4 to get the number per m^2. Repeat in several locations to get an accurate assessment of what cutworm levels are.

Economic Threshold: 4-5 larvae/m^2. Sometimes it is most economical to just treat infested patches, and not whole fields.

Aphids

Typical Damage: Extract plant fluids from the stems, leaves and developing bolls. Can cause fewer seeds to be produced.

When and How to Monitor: The easiest way to detect aphids in flax is to sample the upper portions of the plant with an insect sweep net when the crop is in full bloom, or tap plants over a white tray or bucket. If aphids are found, fields need to be more closely inspected by randomly sampling plants. To inspect plants, lightly tap the plants on a white surface, such as a tray or the canvas of a sweep net, to dislodge the insects. Plants can be severed at the base prior to tapping if desired. Inspect a minimum of 25 plants at full bloom and 20 plants at early green boll randomly in the field to provide an accurate estimate of aphid density. Record total number of aphids and calculate average per plant.

If control is not warranted at full bloom, aphid densities should be assessed again at the green boll stage.

Economic Threshold: Varies with crop value and control costs, but generally about 3 aphids per main stem at full bloom or 8 aphids per main stem at the green boll stage.

The yield loss of flax is 0.3346 bushels/acre per aphid per plant for crops sampled at full bloom and 0.1275 bushels/acre per aphid per plant for crops sampled at the green boll stage.

The potato aphid is highly susceptible to attack by fungi (especially in years of high rainfall and humidity in late June and July). Aphid populations sampled at full bloom that have many diseased insects should be sampled again at the early green boll stage to determine the effect of the disease on aphid densities.

Beet webworm

Nominal Threshold: >10 larvae/m^2

Flax Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	No insecticides registered for the control of wireworms in flax				
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Decis 5EC (P)	80 ml	40	A or G	395
	Matador (P)	34 ml	7	A or G	64-110
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6 leaf stage	G	1030
	Chlorpyrifos (OP)	0.354-0.486 L	21	A or G	205-418
Sap Feeders					
Potato Aphid	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.18 L	21	A or G	60-450
Lygus bugs	Voliam Xpress (D+P)	91 ml	7	A or G	98

Defoliators					
Grasshoppers	Decis 5EC (P)	40 – 60 ml	40	A or G	395
	Matador / Silencer (young grasshoppers only) (P)	25 – 34 ml (Ground) 34 ml (Aerial)	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 500 (OP)	0.44-0.68 L	7	A or G	4302
	Malathion 85E (OP)	0.217-0.346 L	7	A or G	5,500
Bertha Armyworm	Coragen (D)	51 - 152 ml	1	A or G	>5,000
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Lannate (C)	89 – 109 g	8	A or G	30-34
	Chlorpyrifos (OP)	0.304-0.405 L	21	A or G	205-418
Armyworm	Chlorpyrifos (OP)	0.354-0.486 L	21	A or G	205-418
Clover Cutworm	Decis 5EC (P)	40 – 60 ml	40	A or G	395
Variegated cutworm	Chlorpyrifos (OP)	0.354-0.486 L	21	A or G	205-418
Beet Webworm	Decis 5EC (P)	40 – 60 ml	40	A or G	395

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Forage Grasses (Timothy, etc.) Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Sap and Fluid Feeders					
Plant bugs	Lagon / Cygon 480-AG (OP)	0.17 L	2	A or G	60-450
Defoliators					
Grasshoppers	**Spreadable Bran Baits**				
	Eco bran (C)	0.8-1.6 kg	1-2	G	N/A
	Sprays				
	Coragen (D) (for feed)	51 – 101 ml	0	G	>5,000
	Matador / Silencer (P) (on timothy)	25 – 34 ml	14	G	64-110
	Sevin XLR Plus (C)	0.49-0.93 L (for nymphs or sparse vegetation) 0.93-1.42 L (for adults or application to dense vegetation)	1	A or G	649
	Malathion 500 (OP)	0.69 L	7	A or G	4302
	Lagon / Cygon 480-AG (OP)	0.17 – 0.22 L (nymphs) 0.34 – 0.40 L (adults)	2-28	A or G	60-450
European skipper (on timothy)	Dipel 2X DF (M)	57 – 111 g	N/A	A or G	>4,000
Armyworm	Coragen (D) (for feed)	101 – 152 ml	0	G	>5,000

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Field Scouting in Lentils

Grasshoppers

When and How to Monitor: Look for when monitoring fields from the early bud stage through pod development.

Economic Threshold: 2 grasshoppers/m^2 during the flowering and podding stages, especially if two-striped grasshopper is the dominant species.

Lygus Bugs

When and How to Monitor: Look for adult lygus bugs when monitoring lentils during blooming and podding by using a sweep net, making 25 180° sweeps in at least 5 randomly selected places in a field.

Economic Threshold: Insecticide treatment is recommended when 10 or more adults are collected per 25 sweeps.

Pea aphid

Economic Threshold: 30-40 aphids per 180° sweep of a 38 cm (15 inch) diameter insect net, and few natural enemies are present, and when aphid numbers do not decline over a 2-day period.

Lentil Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Pulses (N)	A seed treatment containing Cruiser 5FS and Apron Maxx RFC			
	Cruiser 5FS (N)	17-50 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
	Stress Shield 600 (N)	Seed Treatment			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Decis 5EC (P)	80 ml	30	A or G	395
	Matador / Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6-leaf stage	G	1030
	Chlorpyrifos (for pale western cutworm only) (OP)	0.354-0.486 L	21-60	A or G	205-418
Sap and Fluid Feeders					
Lygus Bugs	Matador / Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Potato Leafhopper	Matador / Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Pea Aphid	Movento	75 - 111 ml	7	G	>2,000
	Matador / Silencer (P)	34 – 94 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14	A or G	98
Defoliators					
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000
	Decis 5EC (P)	40-60 ml (ground) 60 ml (air)	30	A or G	395
	Matador / Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Malathion 500 (OP)	0.68 L	30	A or G	4302
	Malathion 85E (OP)	0.336 L	14	A or G	5,500
	Chlorpyrifos (OP)	0.235-0.486 L	21-60	A or G	205-418

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Mustard Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Root Maggots	No insecticides registered				
Cutworms	**Seed Treatments**				
	Fortenza + Helix Vibrance	Seed Treatment			
	Helix Vibrance + Lumiderm	Seed Treatment			
	Prosper + Lumiderm	Seed Treatment			
	Foliar Sprays				
	Coragen (D)	101 ml	1	A or G	>5,000
	Matador (P)	34 ml	7	A or G	64-110
Sap Feeders					
Lygus Bugs	Decis 5EC (P)	60 ml	7	A or G	395
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Defoliators					
Flea beetles	**Seed Treatments**				
	Fortenza + Helix Vibrance	Seed Treatment			
	Helix Vibrance (N)	A seed treatment containing Helix Xtra and Vibrance 500FS			
	Helix Vibrance + Lumiderm	Seed Treatment			
	Prosper (N)		Seed Treatment	Seed Treatment	N/A
	Prosper + Lumiderm	Seed Treatment			
	Gaucho Canola System (N)	0.833 L/100 kg of seed	N/A	Seed Treatment	N/A
	Gaucho Platinum (N)	1.667 L/100 kg of seed	N/A	Seed Treatment	N/A
	Sombrero (N)	0.67 – 1.33 L / 100 kg seed	Seed Treatment	Seed Treatment	N/A
	Sprays				
	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 85E (OP)	0.217-0.346 L	7	A or G	5,500
Cabbage seedpod weevil	Note: Yellow mustard (*Sinapis alba*) is resistant to cabbage seedpod weevil; oriental and brown mustards (*Brassica juncea*) are susceptible to feeding by cabbage seedpod weevil.				
	Matador /Silencer (adults) (P)	34 ml	7	A or G	64-110
	Decis 5 EC (for control of adults only) (P)	80 ml	7	A or G	395
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Diamondback Moth	Coragen (D)	51 ml	1	A or G	>5,000
	Decis 5 EC (P)	40 – 60 ml	7	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 85E (OP)	0.109-0.168 L	7	A or G	5,500

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Bertha Armyworm	Coragen (D)	51 - 152 ml	1	A or G	>5,000
	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Clover Cutworm	Decis 5EC (P)	40 – 60 ml	7	A or G	395
Imported cabbageworm	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Beet webworm	Decis 5EC (P)	40 – 60 ml	7	A or G	395
Grasshopper	Decis 5EC (P)	40 – 60 ml	7	A or G	395
	Matador /Silencer (young grasshoppers only) (P)	25- 34 ml(Ground) 34 ml (Aerial)	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Malathion 85E (OP)	0.217-0.346 L	7	A or G	5,500

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Oats - See small grain cereals

Grasshopper Management on **Pastures, Rangelands, Hay, Headlands,** and **Roadsides**

Note: Insects for biological control of weeds such as leafy spurge may be introduced and established in some areas of Manitoba and Saskatchewan. If grasshopper numbers become high, consider using control strategies and insecticides that will minimize harm to these biological control agents.

Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Reduced Agent and Area Treatments (RAATs): Grasshoppers on rangelands may be managed by applying certain insecticides in treated swaths, which alternate with untreated swaths. This can reduce the cost of control and amount of insecticide used by more than 50 percent, while resulting in effective control. For more information on managing grasshoppers by this method see: http://www.grasshoppercontrol.com/app/pdf/6.pdf				
Spreadable Bran Baits				
Nolo Bait (Pastures, Rangelands)	Minimum of 0.45 kg		A or G	
Eco bran (pastures, rangelands, field borders, headlands, right-of-way, roadsides, wastelands) (C)	0.8-1.6 kg	0-2 (see label)	G	N/A
Sprays				
Coragen (D) (Pastures and Rangeland)	51 – 101 ml	0	G	>5,000
Decis 5EC (P) (Rangeland, pastures, roadside)	40 – 60 ml	N/A	A or G (Rangeland, pastures) G (Roadsides)	395

Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Mako (P) (Roadsides, headlands, and summerfallow) (young grasshoppers only)	20 – 28 ml	Treated areas must not be grazed or cut for hay.	G	242-542
UP-Cyde (P) (Roadsides, headlands, and summerfallow) (young grasshoppers only)	33 – 46 ml			355
Matador (P) (Unimproved pasture, summerfallow) (young grasshoppers only)	25 – 34 ml (Ground) 34 ml (Aerial)	3	A or G	64-110
Silencer (P) (Unimproved pasture) (young grasshoppers only)	25 – 34 ml (Ground) 34 ml (Aerial)	3	A or G	64-110
Sevin XLR Plus (C) (ditchbanks, field borders, headlands, pastures, rangelands, right-of-way, wastelands)	0.48-1.41 L	0 (ditchbanks, field borders, headlands, right-of-way, wasteland); 1 (pastures, rangeland)	A or G	649
Malathion 500 (OP) (Hay only)	0.69 L	7	A or G	4302
Malathion 85E (OP) (pastures, rangelands)	0.336 L	Do not apply to fields occupied by dairy animals, but may be grazed or harvested on the day of application.	G	5,500
Dibrom (OP) (Rangeland, pastures, dairy and horse paddocks)	0.21-0.33 L (young grasshoppers) 0.27-0.39 L (adult grasshoppers)	4	A or G	345
Lagon /Cygon 480 EC /Cygon 480-AG (OP) (pasture, wasteland)	0.22 L (nymphs) 0.34-0.41 L (Adults)	2 days – 0.22L rate 7-28 days – 0.34-0.41L rates (see labels)	A or G	60-450
Lagon (OP) (Hay)	0.17-0.22 L	2	A or G	60-450
Chlorpyrifos (OP)	Ungrazed and unoccupied areas such as roadsides, right of way, and fence lines adjacent to barley, wheat, oats, or canola, and lentils.		A or G	205- 418

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[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Peas (Field Peas)

Cutworms

Nominal Threshold: 2 to 3 cutworms per square metre.

SAP FEEDERS

Aphids

When and How to Monitor: Look for when monitoring field peas at the beginning of flowering. Take 180° sweeps or check 10 8-inch (20 cm) plant tips at each stop. Record total number of aphids and calculate average per sweep or plant tip.

Economic Threshold: If, at the beginning of flowering, there are 9 to 12 aphids per sweep or 2-3 aphids per 8-inch (20 cm) plant tip, an insecticide application when 50 percent of plants have produced some young pods will be cost-effective.

Peas (Field Peas) Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Pulses (N)	A seed treatment containing Cruiser 5FS and Apron Maxx RFC			
	Cruiser 5FS (N)	17-50 ml/100 kg seed	May be applied on-farm or by commercial seed treaters		
	Stress Shield 600 (N)	Seed Treatment			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6 leaf stage	G	1030
Sap and Fluid Feeders					
Leafhoppers	Malathion 85E (OP)	0.445 L	3	A or G	5,500
Pea Aphid	Movento	75 – 111 ml	7	G	>2,000
	Matador /Silencer (P)	34 - 94 ml	14 (Matador) 21 (Silencer)	A or G	64-110
	Voliam Xpress (D+P)	202 ml	14	A or G	98
	Lannate (C)	0.206 kg	1	G	30-34
	Malathion 85E (OP)	0.445 L	3	A or G	5,500
	Lagon/Cygon 480 EC (OP)	0.11-0.17 L	3–21 (see labels)	A or G	60-450
Defoliator					
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110
Alfalfa Looper	Sevin XLR Plus (C)	1.90 L	3	G	649
	Lannate (C)	0.206 kg	1	G	30-34
Pea leaf weevil	Cruiser Maxx Pulses (N)	A seed treatment combining Cruiser 5FS and Apron Maxx RTA			
	Cruiser 5FS (N)	50 or 83 ml/100 kg seed	On-farm application at the lower rate only.		
	Stress Shield 600 (N)	Seed Treatment			
	Matador /Silencer (P)	34 ml	14 (Matador) 21 (Silencer)	A or G	64-110

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Scouting and Thresholds for Insects in Potatoes

Aphids

Typical damage: Several species of aphids are sap feeders on potato leaves. At very high numbers this sap feeding may cause plants to wilt in small localized areas of the field as "aphid holes". The greatest injury is due to transmission of viruses. Identification and control of aphids is critical in potato seed production to prevent virus spread. In commercial production tuber quality may be reduced by net necrosis of tubers.

When and How to Monitor: Aphid identification and scouting should start in early July when aphids begin to be observed in fields. Sample 25 lower canopy leaves from each of 4 areas in the field (100 leaves in total). Count potato aphids and green peach aphids on each compound leaf, using a magnifying device to identify the species.

Economic threshold: For seed potatoes = 3-10 green peach aphids / 100 leaves. For processing potatoes = 30-100 green peach aphids/100 leaves. There are no economic thresholds for buckthorn and potato aphids. These thresholds relate to transmission of potato leafroll virus and are not useful in determining infectivity relative to potato virus Y. No economic thresholds have been established for aphids that relate to potato virus Y transmission.

Leafhoppers

Typical damage: the potato leafhopper injects a toxin into the plant which results in hopper burn, a yellowing and curling of the tips and margins of the leaflets, which ultimately turn brown and brittle. Damaged plants die prematurely and yield may be reduced.

When and How to Monitor: Nymphs are scouted by visual inspection; sample 100 plants from 3-5 areas of the field. Count the wingless nymphs on compound leaves taken from mid canopy. Adults are sampled with a sweep net (20 sweeps per location at 5 locations for a total of 100 sweeps).

Economic threshold: Nymphs-1 nymph per 10 leaves. Adults-1 leafhopper per sweep.

Colorado potato beetle

Typical damage: Larvae feeding may cause extensive defoliation of leaves and is capable of transmitting spindle tuber virus and bacterial ring rot.

When and How to Monitor: Start scouting for larvae 2 weeks after crop emergence. On field edges, count number of beetles on 20 separate plants. Record % defoliation of leaves. Repeated scouting is required since beetles have developed resistance to many insecticides and 2 generations may occur during the year.

Economic threshold: Economic threshold based on beetle numbers may vary by cost of treatment, expected returns and variety. Typical thresholds are 18 larvae/ 20 plants for Russet Burbank vs 6 larvae/20 plants for Norland. Treat when defoliation exceeds 10%.

Potato flea beetle

Typical damage: Beetle feeding causes "shot holes" in the leaves. Two generations may attack the foliage.

When and How to Monitor: Estimate feeding damage on the leaf or numbers of beetles on plants.

Economic threshold: Early in the season treat if greater than 10% defoliation. Later in the season (August) treat if greater than 25% defoliation or with greater than 65 beetles per plant for Norland or 300 beetles per plant for Russet Burbank.

Potatoes* Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Titan (N)	20.8 ml per 100 kg potato seed pieces			2,000
	Nipsit Inside (N)	20.8 ml per 100 kg potato seed pieces	Seed Treatment	Seed Treatment	3,044
	Capture (P)	8.3 – 14.1 ml per 100 metres of row	21	G	
	Pyrifos 15G (OP)	0.1 kg per 100 metres of row	70	G	
	Pyrinex 480 EC (OP)	0.97 L (based on 90 cm row spacing).	70	G	409
	Thimet 20-G (OP)	105g / 100m in sandy or light soil 161g / 100m in silt or heavy soils	Do not harvest potatoes before 90 days after planting time.	G	5.1 – 13.5

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Cutworms	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6-leaf stage	G	1276
	Mako (P) UP-Cyde (P)	71 ml 115 ml	21	G	242-542 355
	Chlorpyrifos (Redbacked, black, and darksided cutworms only) (OP)	0.971 L (pre-plant) 0.486-0.971 L (seedling)	7	G	205 – 418
Sap or Fluid Feeders					
Aphids	**Seed Piece Treatments**				
	Actara 240SC (N)	See chart on label	N/A	Seed Treatment	>5,000
	Admire SPT / Alias 240 SC / Grapple / Grapple$_2$ (N)	11.79 – 17.69 ml per 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed Treatment	>4,870
	Cruiser Maxx Potato Extreme (N)	20 ml / 100 kg seed	NA	Seed Treatment	
	Titan (N)	10.4-20.8 ml per 100 kg potato seed pieces	N/A	Seed Treatment	2,000
	Nipsit Inside (N)	10.4-20.8 ml per 100 kg potato seed pieces	Seed Treatment	Seed Treatment	3,044
	In-Furrow Application				
	Minecto Duo (N, D)	178 – 283 g		G	>5,000
	Actara 240SC (N)	0.15-0.20 L (based on 90 cm row spacing).		G	>5,000
	Admire 240 F / Alias 240 SC / Grapple / Grapple$_2$ (N)	0.344-0.526 L (based on 90 cm row spacing).		G	4143-4870
	Foliar Sprays				
	Fulfill (HFB)	78.1 g	14	A or G	>5,000
	Beleaf (HFB)	49-65 g	7	G	
	Superior 70 Oil	4 L	14	G	>5,000
	Movento	89 – 148 ml	7	A or G	>2,000
	Closer (SU)	20 – 61 ml	7	A or G	>5,000
	Actara 240SC (N)	44.1 ml	7	A or G	
	Actara 25WG (N)	42.5 g	7	A or G	>5,000
	Admire 240 F / Alias 240 SC / Grapple / Grapple$_2$ (N)	81 ml	7	G	4143-4870
	Assail (N)	22.7-34.8 g	7	G	1,064
	Clutch (N)	28-43 g	14	A or G	4,300
	Concept (N + P)	263 ml	7	G	
	Lannate (C)	0.2185 kg	3	G	30-34
	Malathion 500 (OP)	0.56-0.80 L	3	A or G	4302
	Malathion 85E (OP)	0.297-0.445 L	3	G	5,500
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.22-0.44 L	7	G	60-450
	Imidan (OP)	0.65 kg	7	G	285
	Orthene (OP)	0.30-0.44 kg	21	G	1030-1447
	Thionex EC (OC)	0.6-0.8 L	2	G	110

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Potato psyllid	Agri-mek	91 ml	14	G	300
	Movento	89 – 148 ml	7	A or G	>2,000
	Voliam Xpress (D+P)	202 ml	7	A or G	98
Leafhoppers	**Seed Piece Treatments**				
	Actara 240SC (N)	See chart on label	N/A	Seed Treatment	>5,000
	Admire SPT / Alias 240 SC / Grapple /Grapple$_2$ (N)	11.79 – 17.69 ml per 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed Treatment	>4,870
	Cruiser Maxx Potato Extreme (N)	20 ml / 100 kg seed	NA	Seed Treatment	
	Titan (N)	10.4-20.8 ml per 100 kg potato seed pieces	N/A	Seed Treatment	2,000
	Nipsit Inside (N)	10.4-20.8 ml per 100 kg potato seed pieces	Seed Treatment	Seed Treatment	3,044
	In-Furrow Application				
	Minecto Duo (N, D)	178 – 283 g		G	>5,000
	Actara 240SC (N)	0.15-0.20 L (based on 90 cm row spacing).		G	>5,000
	Admire 240F / Alias 240 SC / Grapple /Grapple$_2$ (N)	0.344-0.526 L (based on 90 cm row spacing).	N/A	G	4143-4870
	Foliar Sprays				
	Actara 240SC (N)	44.1 ml	7	A or G	
	Actara 25WG (N)	42.5 g	7	A or G	
	Clutch (N)	28-43 g	14	A or G	4,300
	Pounce / Perm-UP (P)	73 – 105 ml	1	A or G	1276
	Decis 5EC (P)	40 – 60 ml	3	A or G	395
	Matador / Silencer (P)	34 ml	7	A or G	64-110
	Mako (P)	25 – 50 ml	7	A or G	242-542
	UP-Cyde (P)	57 ml	7	A or G	355
	Concept (N + P)	263 ml	7	G	
	Sevin XLR Plus (C)	0.50 L	7	A or G	649
	Lannate (C)	0.2185 kg	3	G	30-34
	Malathion 500 (OP)	0.56-0.80 L	3	A or G	1375-2800
	Malathion 85E (OP)	0.297-0.445 L	3	G	5,500
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.22-0.44 L	7	G	60-450
	Dibrom (OP)	0.42 L	4	A or G	345
	Imidan (OP)	0.65 kg	7	G	285
	Orthene (OP)	0.30-0.44 kg	21	G	1030-1447
	Thionex EC (OC)	0.6-0.8 L	2	G	10

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Lygus bugs	Pounce / Perm-UP (P) Ambush (P)	73 – 105 ml 57-81 ml	1	A or G	1276
	Decis 5EC (P)	40 – 60 ml	3	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Mako (P)	50 ml	7	A or G	242-542
	UP-Cyde (P)	81 ml	7	A or G	355
	Concept (N + P)	263 ml	7	G	
	Sevin XLR Plus (C)	2.12 – 2.59 L	7	A or G	649
	Lagon /Cygon 480 EC (OP)	0.22-0.44 L	7	G	60-450
	Chlorpyrifos (nymphs only) (OP)	0.405 L	7	G	205 – 418
	Orthene (OP)	0.30-0.44 kg	21	G	1030-1447
	Thionex EC (OC)	0.6-0.8 L	1	G	110
Defoliators					
Colorado potato beetle	Note: Colorado potato beetles have been found to be resistant to several families of insecticides in localized areas of Manitoba. Rotation between different families of insecticides is essential.				
	Seed Piece Treatments				
	Fortenza (D)	10 – 22.5 ml / 100 kg seed	N/A	Seed Treatment	>5,000
	Verimark (D)	45 ml / 100 kg of seed pieces	N/A	Seed Treatment	>5,000
	Actara 240SC (N)	See chart on label	N/A	Seed Treatment	>5,000
	Admire SPT / Alias 240 SC / Grapple /Grapple$_2$ (N)	11.79 – 17.69 ml per 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed Treatment	>4,870
	Cruiser Maxx Potato Extreme (N)	20 ml / 100 kg seed	NA	Seed Treatment	
	Titan (N)	10.4-20.8 ml per 100 kg potato seed pieces	N/A	Seed Treatment	2,000
	Nipsit Inside (N)	10.4-20.8 ml per 100 kg potato seed pieces	Seed Treatment	Seed Treatment	3,044
	In-Furrow Application				
	Verimark (D)	304 – 405 ml (based on 90 cm row spacing)	N/A	G	>5,000
	Minecto Duo (N, D)	178 – 283 g		G	>5,000
	Actara 240SC (N)	0.15-0.20 L (based on 90 cm row spacing).		G	>5,000
	Admire / Alias 240 SC / Grapple /Grapple$_2$ (N)	0.345 -0.525 L	7	G	4143-4870
	Clutch (N)	108-181 g (based on 90 cm row spacing)	14	G	4,300

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Colorado potato beetle *continued*	**Foliar Sprays**				
	Rimon (SB)	0.17-0.33 L	14	G	>5,000
	Entrust (S)	20-40 g	7	G	>5,000
	Success (S)	34 – 67 ml	7	G	>5,000
	Delegate (S)	65-97 g	7	G	>5,000
	Coragen (D)	101 – 152 ml	14	A or G	>5,000
	Actara 240SC (N)	44.1 ml	7	A or G	
	Actara 25WG (N)	42.5 g	7	A or G	>5,000
	Admire / Alias 240 SC / Grapple /Grapple$_2$ (N)	81 ml	7	G	4143-4870
	Assail (N)	16.2-32.4 g	7	G	1,064
	Clutch (N)	28-43 g	14	A or G	
	Pounce / Perm-UP (P) Ambush (P)	73 – 105 ml 57-81 ml	1	A or G	1276
	Decis 5EC (P)	40 – 60 ml	3	A or G	395
	Matador /Silencer (P)	34 – 50 ml	7	A or G	64-110
	Mako (P)	25 – 50 ml	7	A or G	242-542
	Up-Cyde (P)	57 ml	7	A or G	355
	Concept (N + P)	263 ml	7	G	
	Sevin XLR Plus (C)	0.50 L	7	A or G	649
	Malathion 500 (OP)	0.56-0.80 L	3	A or G	4302
	Malathion 85E (OP)	0.297-0.445 L	3	G	5,500
	Dibrom (OP)	0.42 L	4	A or G	345
	Imidan (OP)	0.65 kg	7	G	285
	Chlorpyrifos (larvae only) (OP)	0.405 L	7	G	205 – 418
	Thionex EC (OC)	0.6-0.8 L	2	G	110
Potato Flea Beetle	Verimark (D)	In-furrow application: 304 – 405 ml (based on 90 cm row spacing) Seed-piece treatment: 45 ml / 100 kg of seed pieces.	N/A	In-furrow application or seed-piece treatment	>5,000
	Admire SPT / Alias 240 SC / Grapple$_2$ (N)	11.79 – 17.69 ml per 100 pounds (45.36 kg) of potato seed tubers	N/A	Seed Treatment	>4,870
	Titan (N)	10.4-20.8 ml per 100 kg potato seed pieces			2,000
	Nipsit Inside (N)	10.4-20.8 ml per 100 kg potato seed pieces	Seed Treatment	Seed Treatment	3,044
	Minecto Duo (N, D)	178 – 283 g		G	>5,000
	Admire 240 F / Alias 240 SC / Grapple /Grapple$_2$ (N)	Soil Application: 0.344-0.526 L (based on 90 cm row spacing).	N/A	G	4143-4870
	Pounce / Perm-UP (P) Ambush (P)	73 – 105 ml 57-81 ml	1	A or G	1276

Insect	Insecticide (and insecticide group[1])	Rate / Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Potato Flea Beetle *continued*	Decis 5EC (P)	40 – 60 ml	3	A or G	395
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Mako (P)	25 – 50 ml	7	A or G	242-542
	UP-Cyde (P)	57 ml	7	A or G	355
	Concept (N + P)	263 ml	7	G	
	Sevin XLR Plus (C)	0.50 L	7	A or G	649
	Lannate (C)	0.2185 kg	3	G	30-34
	Dibrom (OP)	0.42 L	4	A or G	345
	Imidan (OP)	0.65 kg	7	G	285
	Chlorpyrifos (OP)	0.405 L	7	G	205 – 418
	Orthene (OP)	0.30-0.44 kg	21	G	1030-1447
	Thionex EC (OC)	0.6-0.8 L	1	G	110
Variegated cutworm	Coragen (D)	101-152 ml	1	A or G	>5,000
	Pounce / Perm-UP (P) Ambush (P)	73 ml 57 ml	1	G	1276
	Mako (P) UP-Cyde (P)	71 ml 115 ml	7	G	242-542 355
	Voliam Xpress (D+P)	202 ml	7	A or G	98
	Sevin XLR Plus (C)	0.1-0.125 L / 300 m of row	7	A or G	649
	Lannate (C)	0.11 -0.22 kg	3	G	30-34
Armyworm	Coragen (D)	101-152 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	7	A or G	64-110
Stem Borers					
European Corn Borer	Rimon (SB)	0.17-0.33 L	14	G	>5,000
	Entrust (S)	35.4 g / acre	7	G	>5,000
	Success (S)	59 ml	7	G	>5,000
	Delegate (S)	65 g	7	G	>5,000
	Coragen (D)	101 – 152 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	7	A or G	64-110
	Pounce /Perm-UP (P) Ambush (P)	73 ml 57 ml	1	A or G	1276
	Concept (N + P)	263 ml	7	G	
	Sevin XLR Plus (C)	1.01 – 2.59 L	7	A or G	649

*Before using any pesticide on potatoes, consult the list of **Agricultural Pesticides Approved for Use**, available from Simplot Canada and McCain Foods (Canada).

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: SB=substituted benzoylurea, S=spinosyns, HFB=Homopteran feeding blockers, D=diamides, SU=sulfoxaflor, N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates, OC=organochlorines.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Rye

Information on typical damage, when and how to monitor, and economic thresholds for cutworms, aphids and armyworms in rye can be found in the section on field scouting in small grain cereals (wheat, barley, oats).

Rye Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Vibrance Cereals Seed Treatment	325 – 650 ml per 100 kg of seed		Seed treatment	5,000
	Cruiser Vibrance Quattro (N)	325 ml / 100 kg seed		Seed Treatment	>5,000
	Cruiser 5FS (N)	17-50 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Pounce / Perm-UP (P)	73 – 158 ml	Treat pior to 6 leaf stage	G	1030
	Ambush (P)	57-121 ml			
Sap Feeders					
Aphids	Malathion 500 (OP)	0.60-0.80 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
Defoliators					
Grasshoppers	**Spreadable Bran Baits**				
	Nolo Bait	Minimum of 0.45 kg		A or G	
	Eco bran (C)	0.8-1.6 kg	14	G	N/A
	Sprays				
	Coragen (D)	51 - 101 ml	1	A or G	>5,000
	Sevin XLR Plus (C)	0.50-1.01 L	14	A or G	649
	Malathion 500 (OP)	0.69 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Lagon /Cygon 480EC (OP)	0.22 L (nymphs) 0.34-0.41 L (adults)	2-28 (see labels)	A or G	60-450
Armyworm	Coragen (D)	101 - 152 ml	1	A or G	>5,000
	Sevin XLR Plus (C)	1.01-2.12 L	14	A or G	649
	Malathion 500 (OP)	0.60-0.80 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: N=neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Safflower Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
Defoliators					
Grasshoppers	Voliam Xpress (D+P)	91 ml	7	A or G	98
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.22-0.40 L	21	A or G	60-450

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: D=diamides, OP=organophosphates.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Small Grain Cereals (wheat, barley, oats)

BELOWGROUND AND SURFACE FEEDERS

Cutworms

Typical Damage: Notched, wilted, dead, or cut-off plants. Plants missing from rows, bare patches appearing in field.

When and How to Monitor: Look for cutworms, and evidence of cutworm feeding, when monitoring in late May to mid-July. Often cutworms will be close to the cut or shriveled plants they have just damaged. Cutworms will sometimes be most abundant in patches or a specific area of a field. In areas of the field where cutworm damage is noticeable, check around damaged plants in a 0.25 m^2 (50cm x 50cm) area. Use trowel or shovel to carefully search through top half to 1 inch of soil for cutworm larvae. Multiply the number of cutworms found by 4 to get the number per m^2. Repeat in several locations to get an accurate assessment of what the cutworm levels are.

Economic Threshold: Pale western cutworm – 3-4/m^2; Redbacked and army cutworm – 5-6/m^2. Well established fall-seeded crops or spring seeded crops with good moisture conditions can tolerate higher numbers. Sometimes it is most economical to just treat infested patches, and not whole fields.

SAP FEEDERS

Aphids

Typical Damage: Visible wilting of plants, yellow patches in fields, plants are sticky.

When and How to Monitor: Look for aphids when monitoring prior to the soft dough stage. While monitoring the field, using a sweep net or tapping plants over a white tray or bucket can alert you to the presence and relative abundance of aphids. If aphid levels appear concerning, a more thorough examination is needed. Count aphids on 20 randomly selected stems in each of 5 areas. Counts should be at least 50 paces apart, and observations should be made well into the center of the field. Too frequently farmers become alarmed after checking a few plants along the margins, especially near shelterbelts, where populations are high. Record the total number of aphids and calculate the average per plant.

Economic Threshold: 12-15 aphids/stem prior to the soft dough stage.

Barley Thrips

When and How to Monitor: Sampling should begin when the flag leaf is first visible and continue until the head is completely emerged from the boot. Barley thrips exhibit an edge effect; there are usually more thrips near protected field margins than other areas of the field. Most thrips can be found under the top 2 leaf sheaths. Unroll the leaf sheaths away from the stem to find the thrips.

Economic Threshold: Insecticide treatments are only effective when applied before heading is complete.

Treat when thrips are equal to or greater than the number calculated by:

Threshold (Thrips/stem) = (Cost of Control ÷ expected $ value per bushel)/0.4

DEFOLIATORS

Grasshoppers

Typical Damage: Black strips along margins of newly emerging crops, head clipping later in season.

When and How to Monitor: Look for grasshoppers when monitoring fields from late – May through to harvest. Check along edges of crop, particularly areas adjacent to hayland, pastures and roadsides. Estimate number of hoppers/yard^2 (m^2).

Economic Threshold: 8-13 grasshoppers/m^2. Early in the season, when grasshoppers are small, 18 grasshoppers/m^2 and visible crop damage may be a more appropriate threshold.

A rough estimate for an economic threshold for grasshoppers in crops to be used as greenfeed has been suggested at 20 grasshoppers/m^2 or higher.

Armyworms

Typical Damage: Leaves stripped from plants, awns chewed from heads, heads clipped.

When and How to Monitor: Check the soil surface for armyworms, and the plants for feeding, when monitoring in mid-June through early-August. At each stop shake plants and carefully check soil surface for dislodged larvae. During the day larvae may be under plant trash, soil clods or in soil cracks. Check the backs of armyworms for parasite eggs.

Economic Threshold: Four unparasitized larvae, smaller than 2.5 cm (1 inch) per square foot. If heads are being clipped, treat when two or more armyworms per square foot are present. For migrating Armyworms: Treat a couple of swaths ahead of the infestation in the direction of movement to form a barrier strip.

SEED FEEDERS ONLY

Wheat Midge (wheat only)

When and How to Monitor: Monitor wheat in July when crop emerges from boot stage until flowering. Check crop canopy at dusk for signs of wheat midge adult activity. At each stop, examine 10 heads. Record the number of midge adults observed on or near heads. Calculate average number of midge per head.

Sticky traps may be used to capture adult midge activity in wheat fields.

Economic Threshold: *For yield only:* 1 adult midge per 4 to 5 heads. At this level of infestation, wheat yields will be reduced by approximately 15% if the midge is not controlled. *To maintain optimum grade:* 1 adult midge per 8 to 10 wheat heads during the susceptible stage.

Small Grain Cereals (wheat, barley, oats) Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[3]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Vibrance Cereals Seed Treatment (N) (Wheat and barley only)	325 – 650 ml per 100 kg seed		Seed treatment	5,000
	Cruiser Vibrance Quattro (N)	325 ml / 100 kg seed		Seed Treatment	>5,000
	Cruiser 5FS (N) (Wheat and barley only)	17-50 ml / 100 kg seed	May be applied on-farm or by commercial seed treaters		
	Nipsit Suite Cereals (N) (Wheat only)	326 ml per 100 kg seed	Seed Treatment	Seed Treatment	>5,000
	Nipsit Inside (N)	17-100 ml per 100 kg seed	Seed Treatment	Seed Treatment	3,044
	Alias 240 SC (N)	42 – 125 ml / 100 kg seed		Seed Treatment	
	Raxil ProShield (N)	A co-pack of Raxil Pro and StressShield 600			
	Raxil WW (N)	A combination of Raxil MD and Stress Shield (imidacloprid).			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Decis 5EC (P)	80 ml	31 (oats) 40 (barley, wheat)	A or G	395
	Mako (P) (barley and wheat only)	71 ml	21	G	242-542
	UP-Cyde (P) (barley and wheat only)	115 ml			355
	Pounce / Perm-UP (P)	73 – 158 ml	Treat prior to 6-leaf stage	G	1030
	Ambush (P)	57-121 ml			
	Chlorpyrifos (OP)	0.354-0.486 L	60	A or G	205-418

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[3]
Sap and Fluid Feeders					
Aphids	Malathion 500 (OP)	0.60-0.8 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Cygon 480 EC /Cygon 480-AG (OP)	0.17 L	2	A or G	60-450
Thrips	Lannate (C)	0.1214kg	20	A or G	30-34
	Lagon /Cygon 480 EC /Cygon 480-AG (OP)	0.40 L	7-21 (see labels)	A or G	60-450
Brown Wheat Mite	Chlorpyrifos (OP)	0.253 L	60	A or G	205 - 418
Defoliators					
Grasshoppers	**Spreadable Bran Baits**				
	Nolo Bait	Minimum of 0.45 kg		A or G	
	Eco bran (C)	0.8-1.6kg	14 (oats, wheat) 28 (barley)	G	
	Sprays				
	Coragen (D)	51 - 101 ml	1	A or G	>5,000
	Decis 5EC (P)	40 – 60 ml (ground) 60 ml (air)	31 (oats) 40 (wheat, barley)	A or G	395
	Mako (P) (young grasshoppers only) (wheat and barley only)	20 – 28 ml	30 (wheat) 45 (barley)	G	242-542
	UP-Cyde (P) (young grasshoppers only) (wheat and barley only)	33 – 46 ml	30 (wheat) 45 (barley)	G	355
	Matador /Silencer (P) (young grasshoppers only)	25 – 34 ml (Ground) 34 ml (Aerial)	Do not apply within 28 days of harvest or 14 days of livestock foraging	A or G	64-110
	Sevin XLR Plus (C)	0.50-1.01 L	14 (wheat, oats) 28 (barley)	A or G	649
	Malathion 500 (OP)	0.68 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Chlorpyrifos (OP)	0.235-0.354 L	60	A or G	205-418
	Lagon /Cygon 480EC (OP)	nymphs-0.22 L adults-0.34-0.40 L	2-28 (see labels)	A or G	60-450
Cereal Leaf Beetle	A parasitoid of cereal leaf beetle, *Tetrastichus julis*, has been released and established in many areas.				
	Malathion 500 (OP)	0.22 – 0.45 L	7	A or G	4302
	Malathion 85E (OP)	0.435 L	7	A or G	5,500

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[3]
Armyworm	Coragen (D)	101 - 152 ml	1	A or G	>5,000
	Delegate (S)	40-81 g	21	G	>5,000
	Matador / Silencer (P)	34 ml	Do not apply within 28 days of harvest or 14 days of livestock foraging	A or G	64-110
	Sevin XLR Plus (C)	1.01-2.12 L	14 (wheat, oats) 28 (barley)	A or G	649
	Lannate (C)	0.1093-0.2185kg	20	A or G	30-34
	Malathion 500 (OP)	0.60-0.80 L	7	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Chlorpyrifos (OP)	0.354 – 0.486 L	60	A or G	205-418
Slugs	Sluggo Professional	10-20 kg		G	>5,000
Pests of Seed Only					
Wheat Midge (a pest of wheat only)	Rotate Crops – Continuous wheat cropping encourages higher wheat midge populations.				
	Resistant Varieties – the following varieties are resistant to feeding by wheat midge: CWRS varieties: AC Goodeve, AC Unity, AC Fieldstar, AC Shaw, CDC Utmost, and AC Vesper. CPSR Varieties: AC Conquer, AC Enchant, AAC Foray. CWES variety: AC Glencross. Durum: AAC Marchwell.				
	Biological Control - A parasitoid, *Macroglenes penetrans*, was found to control an average of 32% of the wheat midge in Saskatchewan.				
	Chlorpyrifos (OP)	0.336-0.405 L	60	A or G	205-418
	Lagon / Cygon 480 EC / Cygon 480-AC (OP)	0.40 L	21	A or G	60-450
Stem-Borers					
Hessian Fly	• Never plant wheat in the same field 2 years in a row in areas where Hessian flies are a problem. • The spring wheat cultivar Superb is partially resistant to the Hessian fly. • Early seeded spring wheat is less susceptible to stem breakage caused by Hessian fly than later seeded wheat. • Winter wheat planted in September will likely be free of Hessian flies.				
Wheat Stem Maggot	Crop rotation and stubble cultivation may reduce populations				
Wheat stem sawfly	Solid-stem wheat varieties (such as the hard red spring wheat varieties AC Lillian, AC Abbey and AC Eatonia, and the durum variety AAC Raymore) can reduce damage by wheat stem sawfly larvae compared to susceptible varieties, however the level of control can vary depending on environmental conditions.				

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: S=spinosyns, N= neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Scouting for insects in Soybeans

Soybean Aphid

Typical Damage: Soybean aphids suck sap from soybean plants. Infested leaves may wilt or curl when infestations are large. Other symptoms may include plant stunting, reduced pod and seed count, and yellowing of leaves.

When and How to Monitor: Check 30 plants (6 plants in 5 areas) per field. Examine the entire plant and estimate populations of soybean aphids (counting exact numbers will not be possible or practical with higher populations). Once soybean aphid numbers reach 250 aphids per plant, scout the field frequently to determine if soybean aphid numbers are increasing. A population can stay at 250-300 aphids per plant and not cause economical yield loss. If the aphid levels are not rising above 250-300 per plant, there is a good indication that field conditions are favouring natural enemies (such as beneficial insects and fungi) that are helping control the aphids.

Economic Threshold: When there are on average at least 250 aphids per plant and the population is increasing, and the plants are in the R1 (beginning bloom) to R5 (beginning seed) growth stages, treatment would be economical. This threshold gives an approximate 7-day lead time before aphid populations are expected to exceed the economic injury level (670 aphids per plant), where cost of control is equal to yield loss. When soybean aphid populations are not actively increasing above 250 aphids per plant, natural enemies are keeping up with the aphid population. Do not use an insecticide in this case, as it will kill the natural enemies which may enable the aphid population to increase above the economic injury level.

Soybean Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD_{50} (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Cruiser Maxx Vibrance Beans (N)	A seed treatment combining Cruiser Maxx Beans and Vibrance 500FS			
	Cruiser 5FS (N)	83 ml / 100 kg seed	May only be applied by commercial seed treaters		
	Alias 240 SC	Apply 260 – 520 ml per 100 kg seed			
	Stress Shield 600 (N)	Seed Treatment			
Seedcorn Maggot	Cruiser Maxx Vibrance Beans (N)	A seed treatment combining Cruiser Maxx Beans and Vibrance 500FS			
	Cruiser 5FS (N)	50-83 ml / 100 kg seed	May only be applied by commercial seed treaters		
	Alias 240 SC (N)	Apply 260 – 520 ml per 100 kg seed			
	Stress Shield 600 (N)	Seed Treatment			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Matador /Silencer (P)	34 ml	21	A or G	64-110
Sap or Fluid Feeders					
Soybean Aphid	Movento	75–111 ml	21	A or G	>2,000
	Matador /Silencer (P)	34-94 ml	21	A or G	64-110
	Voliam Xpress (D+P)	202 ml	21	A or G	98
	Concept (N + P)	132 - 263 ml	20	G	
	Lagon /Cygon 480 EC /Cygon 480-AG (OP)	0.28-0.40 L	30	A or G (Lagon, Cygon 480 EC) G only (Cygon 480-AG)	60-450
Leafhoppers	Lagon /Cygon 480 EC /Cygon 480-AG (OP)	0.28-0.40 L	30	A or G (Lagon, Cygon 480 EC) G only (Cygon 480-AG)	60-450

Lygus bugs	Matador / Silencer (P)	34 ml	21	A or G	64-110
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.28-0.40 L	30	A or G (Lagon, Cygon 480 EC) G only (Cygon 480-AG)	60-450
Spider mites	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.40 L	30	A or G (Lagon, Cygon 480 EC) G only (Cygon 480-AG)	60-450
Defoliators					
Armyworms	Coragen (D)	101-152 ml	1	A or G	>5,000
	Delegate (S)	40-81 g	28	G	>5,000
Corn Earworm	Coragen (D)	101-152 ml	1	A or G	>5,000
	Voliam Xpress (D+P)	202 ml	21	A or G	98
Grasshoppers	Coragen (D)	51 – 101 ml	1	A or G	>5,000
	Matador / Silencer (P)	34 ml	21	A or G	64-110

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: N= neonicotinoids, P=pyrethroids, OP=organophosphates.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Stored Grain Insect Control-

See Insect Control in Stored Grain; after Insect Management Charts (pages 532-535).

Summerfallow-

See grasshopper management on Pastures, etc.

Scouting for insects in Sunflowers

BELOWGROUND AND SURFACE FEEDERS

Cutworm

Typical Damage: Notched, wilted, dead, and cut-off plants (weed or crop seedlings). Plants missing from rows, bare patches appearing in field.

When and How to Monitor: Look for cutworms, and evidence of cutworm feeding, when monitoring sunflowers in late May to mid-July. Often cutworms will be close to the cut or shriveled plants that they have just damaged. Cutworms will sometimes be most abundant in patches or a specific area of a field. In areas of a field where cutworm damage is noticeable, check around damaged plants in a 0.25 m^2 (50cm x 50cm) area. Use trowel or shovel to carefully search through top half to 1 inch of soil for cutworm larvae. Multiply the number of cutworms found by 4 to get the number per m^2. Repeat in several locations to get an accurate assessment of what the cutworm levels are.

Nominal Threshold: 1 cutworm or more per square foot (30 by 30 cm) or if there is a 25 to 30% stand reduction. Sometimes it is most economical to just treat infested patches, and not whole fields.

DEFOLIATORS

Sunflower Beetle

Typical Damage: Adults: Leaves of seedling plants chewed or completely destroyed late May through June, shot-holes or large areas of leaves chewed July through August. Larvae: Leaves of plants chewed or completely destroyed.

When and How to Monitor: Adults: Look for when monitoring sunflower seedlings in May through June. Examine 10 plants at random at each stop. Larvae: Look for when monitoring sunflowers in July through mid-August. Examine 10 plants at random at each sampling site. Peel back leaves around growing tip and record total number of larvae found. Calculate average number per plant.

Economic Threshold: Adults: 1-2/seedling; Larvae: 10 to 15/plant or 25-30% defoliation.

Insects affecting the seeds

PESTS OF SEED ONLY

Red Sunflower Seed Weevil

Typical Damage: Seeds partly or completely destroyed, exit hole in hull. Shriveled kernels, kernels completely destroyed.

When and How to Monitor: Monitor fields when ray petals being to form and continue every 2 to 3 days until pollination is complete. When scouting, use the X pattern and begin counts at least 70 to 100 feet into the field to avoid margin effects. Examine 5 plants at each site for a total of 25 plants. For checking individual sunflower heads, brush the face of the head vigorously to bring the weevils to the surface, or use a commercial preparation of mosquito repellent containing diethyl toluamide (DEET) to spray the heads. This will cause the weevils to move out of hiding spots. Record total number of weevils and calculate average per head.

Economic Threshold:

Confection Sunflowers: 1-2 weevils/plant. Control is based on a need to keep seed damage below 3 or 4% because of industry standards.

Oilseed sunflowers: 12-14 weevils/head.

The ideal plant stage to treat is when most plants in the field are at 40% pollen shed (R5.4).

Banded Sunflower Moth

When and How to Monitor: Look for banded sunflower moth adults when monitoring fields in the late bud (R-4) to early bloom (R5.1) plant growth stage. Count moths on 20 plants from 5 different sites for a total of 100 plants. Sampling in early evening or early morning when the moths are most active gives the most accurate counts.

Sampling strategies based on scouting for adult moths during daylight hours, and counting eggs, have also been developed.

Economic Threshold: 1 moth per 2 plants when monitoring in the early evening or early morning.

If monitoring for eggs or adult moths during daylight hours, tables for determining economic thresholds can be found at: http://www.ag.ndsu.edu/extensionentomology/field-crops-insect-pests/Documents/sunflower/e-823-banded-sunflower-moth
If treatment is warranted, it should be applied at the R5.1 sunflower plant growth stage.

Lygus bugs

Economic Threshold: Confection - One adult lygus bug per 9 heads can result in economic losses through the reduction in seed quality. Lygus bug management should be initiated between the R4 to R5.1 stage if adult densities reach economic levels. Oilseed sunflowers are not believed to be at risk of damage from lygus bugs.

Sunflowers Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Belowground and Surface Feeders					
Wireworms	Wireworms may sometimes damage sunflowers. Seeding sunflowers when the soil temperature is at least 8 to 10°C at 1 to 1.5 inches depth may minimize damage by wireworms.				
	Cruiser Maxx Sunflowers (N)	A seed treatment combining Cruiser 5FS with Maxim 480FS and Apron XL. Sunflower Seeds can not be treated with Cruiser Maxx Sunflowers in Canada.			
Cutworms	Coragen (D)	101 ml	1	A or G	>5,000
	Pounce / Perm-UP (P) Ambush (P)	73 – 158 ml 57-121 ml	Treat prior to 6-leaf stage	G	1030
	Chlorpyrifos (OP)	0.486 L	42	G	205-418
Defoliators					
Sunflower Beetle	Cruiser Maxx Sunflowers (N)	A seed treatment combining Cruiser 5FS with Maxim 480FS and Apron XL. Sunflower Seeds can not be treated with Cruiser Maxx Sunflowers in Canada			
	Decis 5EC (P)	40 ml	70	A or G	395
	Matador /Silencer (P)	17– 25 ml(Ground) 34 ml (Aerial)	7	A or G	64-110
	Mako (P)	28 ml	70	A or G	242-542
	UP-Cyde (P)	40 ml	70	A or G	355
	Voliam Xpress (D+P)	91 ml	7	A or G	98

Pests of Head and Seeds					
Lygus bugs	**Note:** Because the most appropriate timing of insecticides to control Lygus bugs in sunflowers includes flowering stages, steps to minimize harm to pollinators should be taken (see page 491-492) and insecticides should only be used when economic thresholds are exceeded.				
	Matador	34 ml	7	A or G	64-110
	Voliam Xpress (D+P)	91 ml	7	A or G	98
Sunflower Seed Weevil	Early planting helps to reduce seed damage by sunflower seed weevils				
	Note: Because the most appropriate timing of insecticides to control sunflower seed weevils is during the flowering stage, steps to minimize harm to pollinators should be taken (see page 491-492) and insecticides should only be used when economic thresholds are exceeded.				
	Mako (P)	28 ml	70	A or G	242-542
	UP-Cyde (P)	40 ml	70	A or G	355
	Chlorpyrifos (OP)	0.486 L	42	A or G	272/205
Banded sunflower moth	Late planting may provide some control				
	Note: Because the most appropriate timing of insecticides to control banded sunflower moth includes flowering stages, steps to minimize harm to pollinators should be taken (see page 491-492) and insecticides should only be used when economic thresholds are exceeded.				
	Coragen (D)	101 - 152 ml	1	A or G	>5,000
Sunflower Moth	Dipel 2X DF (young larvae) (M)	127 – 253 g	N/A	A or G	> 4,000
Sunflower Midge	Some cultivars show some resistance to feeding by sunflower midge				

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: M=microbial, D=diamides, N=Neonicotinoids, P=pyrethroids, C=carbamates, OP=organophosphates.

[2] LD_{50} values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD_{50}.

Field Scouting in Sweet Clover

DEFOLIATORS

Sweetclover Weevil

Typical Damage: Adults chew crescent-shaped and jagged notches in leaves and can completely defoliate plants.

When and How to Monitor: Inspect clover seedlings for weevil damage in spring as the seedlings emerge. In midsummer and throughout August, inspect first-year clover stands for damage along crop margins. Invading weevils move into these stands only as far as necessary to satisfy their food requirements, so an insecticide application to affected field margins is usually all that is required. Visually estimating the number of weevils per plant must be done carefully because weevils fall from plants easily and are difficult to see on the ground.

Economic Threshold: 1st year stands: 1 weevil adult/3 seedlings (1/5 seedlings under dry conditions). 2nd year stands: 9-12 weevil adults/plant.

Sweet Clover Insect Management Chart

Insect	Insecticide (and insecticide group[1])	Rate/Acre	Preharvest interval (days)	Application (A=aerial; G=ground)	LD$_{50}$ (Mammalian Toxicity)[2]
Defoliators					
Grasshoppers	**Spreadable Bran Baits**				
	Eco bran (C)	0.8-1.6kg	2	G	N/A
	Sprays				
	Sevin XLR Plus (C)	0.50-1.01 L	2	A or G	649
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
Sweetclover Weevil	Locate new seedlings as far as possible from 2nd-year clover. Cultivating second-year stands of sweet clover silage and hay as soon as possible after the crop is taken kills the new- generation weevil larvae in the soil.				
	Malathion 500 (OP)	0.56-1.01 L	7-Cattle may be returned immediately after spraying.	A or G	4302
	Malathion 85E (OP)	0.445-0.544 L			5,500
	Lagon / Cygon 480 EC / Cygon 480-AG (OP)	0.34-0.45 L	28	A or G	60-450
Alfalfa weevil	Coragen (D) (suppression only)	152-202 ml	0	G	>5,000
Blister Beetles	Sevin XLR Plus (C)	1.01-1.6 L	2	A or G	649
Beet Webworm	Sevin XLR Plus (C)	1.01-2.12 L	2	A or G	649
Sap or Fluid Feeders					
Lygus Bugs	Dibrom (OP)	0.42-0.85 L	4	A or G	345
Leafhoppers	Sevin XLR Plus (C)	1.01-1.6 L	2	A or G	649
	Malathion 85E (OP)	0.445-0.544 L	7	A or G	5,500
	Dibrom (OP)	0.42-0.85 L	4	A or G	345
Aphids	Dibrom (OP)	0.42-0.85 L	4	A or G	345

ALWAYS CONSULT THE INSECTICIDE LABEL BEFORE APPLYING ANY INSECTICIDE.

[1] Insecticide Group: C=carbamates, OP=organophosphates.

[2] LD$_{50}$ values represent the relative toxicity of a pesticide. They represent the dose (in mg/kg body weight) that will kill 50% of the test animals. Thus the lower the number the greater the toxicity. Values given are for oral LD$_{50}$.

Timothy-

See forage grasses

Wheat-

See small grain cereals

Insect Control in Stored Grain

Prevention

Clean in and around storage facilities. Grain storage facilities, and the area around storage facilities, should be cleaned thoroughly prior to storing grain.

Clean equipment used to move grain. Grain left in equipment throughout the summer months can result in new grain that is being placed into storage becoming infested. Combines, truck beds, grain wagons, augers and other equipment used to move grain should be cleaned of grain residue. Other potential sources of grain infesting insects include livestock feeds, old seed bags, spilled grain, etc.

Inspect grain storage facilities for signs of deterioration, especially for leaks or holes through which insects or rodents can gain access to the stored grain. Moving and storing the grain in clean facilities will eliminate one source of infestation. However, grain stored for long periods of time still has the potential for renewed infestations.

Treating storage facilities. Depending on the commodity to be stored, storage facilities may additionally be sprayed or dusted, if needed, with a recommended insecticide before storing grain in the bin (e.g. malathion, diatomaceous earth or cyfluthrin – refer to product labels for details). ***Note*** - some commodities, such as canola, flax and sunflowers, should not be stored in facilities recently treated with malathion or cyfluthrin (*Tempo*).

Dry and Cool Grain. Ideally, the grain should be dry before being put into storage, and cooled as quickly as possible. For long-term storage, producers are urged to lower the grain temperature below 15°C as soon as possible after the grain is placed in storage. At 15°C the stored product insects stop laying eggs and development stops. Aeration systems used during the night immediately after harvest should have the grain below 15°C in about 2 weeks. Grain that is not moved or aerated after harvest can remain warm enough to allow insects to survive the winter. Convection currents arising from this warm air can also promote condensation, sprouting (heating) and mould growth in unmanaged grain. These conditions are very attractive to stored product pests and support their development.

Once the grain mass is cooled to the desired temperature, fans should be sealed to prevent unwanted air migration through the mass that could result in early grain mass warm-up. Cold grain has a longer storage life than warm grain.

Note however that under cool grain temperatures, insect movement is reduced to the point that some insecticides may not be effective.

Monitoring for Insects

Bin probe and Sieves: Stored grain insects can be monitored by taking grain samples with a bin probe, sieving the grain, and looking in the dockage for Insects.

Probe Traps: Another means of detecting insects in stored grain is through placing probe traps (such as the WB PROBE II Trap from Trece) in the grain and monitoring them. Often the first indication of an infestation will be found near the top centre of a storage bin, and therefore, this is where traps should be placed. Monitoring should take place once every 7-10 days during the onset of storage (first 60 days) and then the frequency of monitoring may be adjusted.

Identifying insects in stored grain

Correct identification of insects found in stored grain is important in determining the most appropriate control methods. Some of the insects found in stored grain feed directly on the grain, referred to as primary pests, while others feed on grain that is damaged or going out of condition, referred to as secondary pests.

Primary insect pests:

Insects that feed directly on the grain include rusty grain beetles, red flour beetles, and sawtoothed grain beetles.

The **rusty grain beetle** is the most common stored product insect. Heavy infestations of this insect cause grain to heat and spoil.

The **red flour beetle** is the another common insect pest of stored grain in the prairies. Red flour beetles cannot feed on undamaged, dry seed with less than 12% moisture content. They prefer grain dust, broken grain and milled stocks.

Sawtoothed grain beetles are more common in stored oats than in stored wheat and barley.

Secondary insect pests:

Insects that feed on fungus in the grain bin or stored grain that is damaged include the foreign grain beetle, hairy fungus beetle, psocids, and grain mites.

Foreign grain beetles resemble the rusty grain beetle, but can be distinguished from it by club-shaped antennae. Also, when placed in a glass jar, foreign grain beetles will climb up the sides, while rusty grain beetles cannot. While foreign grain beetle is considered a fungus feeder, they will feed on grain if the moisture content is in the high end of the acceptable range (eg. 14.5% mc wheat).

Grain mites are whitish, about 0.2 to 0.5 mm long, and can be hard to see with the naked eye. About eight kinds of mites are common in farm granaries and elevators.

Psocids are soft-bodied insects, about 1 mm long, with long antennae relative to the body size.

Fungus feeding insects and mites cannot survive in dry grain. Chemical control is not necessary for fungus feeding pests in stored grain. Practices that result in the grain drying may be all that is needed to control such pests.

Information to help identify insect pests of stored grain can be found at: http://www.grainscanada.gc.ca/storage-entrepose/keys-cles/sgp-irg/sgp-irg-eng.htm

Control Techniques:

The Canada Grain Act states that an elevator operator may reject any grain if the operator has reason to believe it is infested or contaminated. Outlined below are some control techniques and when and how these techniques can be best used.

Cold Temperatures

Rusty grain beetles are cold hardy and can survive subzero temperatures. Rusty grain beetles and other stored grain insects can be killed by reducing core grain temperatures as follows:

Time Required to Kill Insects at Various Grain Temperatures

Grain Temperature	Time required to kill insects
-5°C	12 weeks
-10°C	8 weeks
-15°C	4 weeks
-20°C	1 week

Cooling the grain, through aeration or moving the grain several times during mid-winter, should provide effective control of rusty grain beetles.

Moving Grain

Moving grain using cyclone-based pneumatic conveyors (grain vacs) at about 200 bushels per hour has been shown to be an effective means of controlling insects in stored grain. However, moving too large a volume of grain at a time using a pneumatic conveyor results in the grain protecting the insects and reduces kill of stored grain insects. Loading the grain using a pneumatic grain conveyor removes insects from grain being delivered to elevators.

Phostoxin

Company: Degesch America Inc. (Phostoxin); PCP#15736 (Round tablets).

Formulation: 55% aluminum phosphide.

Formulation	Primary Use	Container Size
Phostoxin tablets (3g each)	On the farm or country elevator	500 tablets
Phostoxin pellets (0.6g each)	In terminals	2500 pellets
Phostoxin tablets prepac	Containers	4 strips of 33 tablets to a pouch

Insects and other pests controlled: Rusty grain beetle, red flour beetle, saw-toothed grain beetle, granary weevil, Indian meal moth, yellow mealworm, lesser grain borer, nematodes, mice and rodents.

Approved for use on the following stored grains: Barley, corn, dried peas, lentils, oats, rice, rye, soybeans, sunflower seeds, triticale and wheat.

Restricted Product: The use and sale of Aluminum Phosphide (Phostoxin) is restricted to licensed pesticide applicators possessing a valid fumigation licence (Saskatchewan) or stored agricultural products license (Manitoba).

Phostoxin can only be used in conjunction with a detailed fumigation management plan.

Rate and Minimum Exposure Period: Refer to labels to determine rate. For grain bins a dosage of 250-500 tablets (or 880-2560 pellets) per 100m3 of bin space being treated (not volume of grain) is recommended. It is important to ensure that bins are relatively secure. It is not advisable to use phosphine products in bins that are leaky or not well sealed.

The following table may be used as a guide to determine the minimum length of exposure period to phostoxin at the indicated temperatures:

Temperature	Exposure Period
Below 5°C (40°F)	Do not fumigate
5°C-12°C (40°-53°F)	10 days
13°-15°C (54°-59°F)	5 days
16°-20°C (60°-68°F)	4 days
above 20°C (68°F)	3 days

Phostoxin can not be used when the grain temperature is below 5°C as the tablets release the gas too slowly. Very dry grain will also slow the release of the gas from the pellets. A shortened exposure period cannot be compensated for by increased dosage. Also ensure that storage is well ventilated for at least 24 hours after the required time for fumigation.

Protect-It, Insecto

Company: Hedley Technologies Ltd. (Protect-It) PCP#24259; Natural Insecto Products Inc. (Insecto) PCP#22489

Formulation: 90 percent Diatomaceous Earth (DE)

Insects controlled: Rusty grain beetle (Protect-It only), rice weevil, granary weevil, Angoumois grain moth, Mediterranean flour moth, Indian meal moth, red flour beetle and Tribolium.

Approved for use on the following stored products: Feed grains, seed, stored grains, wheat, barley, buckwheat, corn, oats, rye, flax, peas, soybeans and sorghum. Also registered for structural treatment of empty grain storage and transportation containers.

How it works: Diatomaceous earth damages the cuticle of the insect, reducing the insect's ability to retain moisture. The insect eventually dies from dehydration.

Rate, for empty storage structures: Use a dust blower or aeration fan to get diatomaceous earth into the cracks, crevices and void spaces of the structure being treated. Dust areas at a rate of 1 kg per 200 square metres (5 g/m^2).

Rate, while grain is being placed into storage: Protect-It; The application rate for Protect-It varies by crop and insect species, ranging from 100 g/tonne for control of rusty grain beetle in wheat to 1000 g/tonne for red flour beetle in corn. Refer to the label for details.

Insecto; Apply to grain at the time of storage at a rate of 0.5 to 1 Kg per metric ton of grain (500-1000 ppm).

Precautions: The application of DE will lower the test weight measurement of the grain, but usually not to the point of downgrading. If test weight loss is excessive, the grain can be diluted with untreated grain. DE is non-toxic to humans and animals.

Malathion Grain Dust

Company: Interprovincial Co-operative (Malathion Grain Protectant Dust) PCP#17222; United Agri Products (Malathion Grain Protector Dust) PCP# 15896

Formulation: 2% malathion

Insects controlled: confused flour beetles, flat grain beetles, granary weevil, Indian meal moth, lesser grain borer, rusty grain beetle and sawtoothed grain beetle.

Approved for use on the following stored grains: Wheat, rye, barley and oats as stored grains.

Malathion Grain Dust can be applied to grain as it is being loaded into a bin or being turned by adding gradually at the grain auger. It can also be used to control surface infestations by applying to the grain surface and raking in to 15 cm depth of the grain. Malathion controls insects by ingestion and contact and insects must be active for it to be effective.

Rate:

Crop	Rate-g/1000 kg (tonne) grain
Wheat	415
Rye	450
Barley	520
Oats	735

Do not apply to grain within 7 days of sale.

Be aware that the Canadian Grain Commission allows only 8 ppm of malathion residues in stored grains.

Malathion 500, Malathion 85E

Refer to labels for these products for insect and mite control in *empty* grain bins, grain elevators, grain box cars and flour mills.

Note – Some commodities, such as canola, should not be stored in facilities recently treated with malathion.

Malathion 500 (IPCO)

Insect	Rate	Note
Rusty grain beetle, sawtoothed grain beetle, confused flour beetle, grain mite, granary weevil, Indian meal moth, lesser grain borer (empty grain bins)	250-300 ml/5 L of water on 100 m^2	May be used within 1 day of grain storage

Malathion 85E (United Agri Products),

Insect	Rate	Note
Rusty grain beetle, red flour beetle, sawtoothed grain beetle, confused flour beetle, grain mite, granary weevil, Indian meal moth, lesser grain borer, flat grain beetles, rice weevils (empty grain storage facilities)	Mix 490 ml in 15 L of water. Apply 5 L of mixture on 100 m^2	Wait until spray has thoroughly dried before storing grain in treated areas.

Tempo 20 WP

Company: Bayer CropScience PCP#25673

Formulation: 20% cyfluthrin. Tempo is a group 3 (pyrethroid) insecticide.

Application: Tempo can be used to control insects in grain storage facilities, truck beds and other areas where grain is stored *before filling these areas with grain*. Cleaning of all areas prior to use of Tempo 20 WP insecticide will increase levels of control. See the insecticide label for specific mixing instructions.

Insecticide Product Pages

For rates and preharvest intervals for insecticides, see the insect management charts on pp. 494-531.

Actara

Insecticide Group – 4A
(Refer to page 493)

Company:

Syngenta

Formulation:

Actara 240SC (PCP#28407): 240 g/L thiamethoxam formulated as a soluble concentrate.

Container size - 2 X 2.04 L

Actara 25WG (PCP#28408): 25% thiamethoxam formulated as a water dispersible granule.

Container size - 4 X 850 g

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle, aphids, potato leafhopper

Application:

Actara 240SC** - **Soil application: Apply as an in-furrow spray during planting to allow the insecticide to be absorbed by plant roots. For 90 cm row spacing, apply 151 to 196 mL/acre. Use the higher rate for extended control. DO NOT follow a soil application with a foliar application.

Potato seed piece treatment: Choose the appropriate rate from the chart on label, based on seeding rate. Apply only in areas with adequate ventilation or in areas that are equipped to remove mist or dust. Best results are obtained if potatoes are planted immediately after *Actara 240SC* is applied to seed. When transporting cut and treated seed ensure the seed is covered. DO NOT apply a subsequent treatment of in-furrow or foliar application of thiamethoxam or other Group 4 insecticide following seed piece treatment with *Actara 240SC*.

Foliar application: *Actara* may be applied by ground or air. For ground application use a minimum of 40 L / ac unless otherwise indicated on label. A maximum of 2 foliar applications of *Actara* may be made per season. DO NOT exceed a total of 88 g/acre. Allow at least 7 days between applications. DO NOT use a foliar application of *Actara* following in-furrow or soil application of *Actara*.

How it Works:

Actara is a systemic (taken up into the plant foliage after application), chloronicotinyl insecticide.

Restrictions:

Rainfastness:

Avoid application of this product when heavy rain is forecast. Actara is rainfast once spray has dried on treated plants.

Preharvest Interval:

DO NOT harvest within 7 days of application.

Re-Entry:

DO NOT re-enter treated areas for 12 hours after foliar application.

Re-cropping: No restrictions following the harvest of sorghum, wheat, barley, canola, potatoes or cover crops. For all other crops 120 day plant-back interval is required.

Tank mix: Potatoes - *Actara 240SC* can be mixed with *Quadris® Flowable* fungicide and *Ridomil® Gold 480SL* fungicide (or *Ridomil Gold 480EC* fungicide).

Buffer Zones: Buffer zones are required for the protection of terrestrial and freshwater habitats. Refer to specific label for buffer zones required.

Precautions:

Actara is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Wait a minimum of 5 days after treatment before placing beehives in a treated field.

Hazard Rating:

Actara 240SC: Caution – Poison
Actara 25WG: Caution – Eye and skin irritant

For an explanation of the symbols used here see page 11.

Agri-Mek SC

Insecticide Group – 6
(Refer to page 493)

Company:

Syngenta Canada Inc. (PCP#31607)

Formulation:

84 g / L abamectin formulated as a suspension concentrate.

Container sizes – 200 mL – 1050 L containers

Insects Controlled and Registered Crops:

CROP	INSECT
Potatoes	Potato psyllid and spider mites

Application:

Agri-Mek can be applied by ground only. Apply when pests first appear. Apply in sufficient in solution to ensure thorough coverage of plant foliage. Avoid application when heavy rain is forecast.

How it Works:

Agri-Mek interferes with neuro-transmission in insects and mites resulting in paralysis, cessation of feeding and eventually death of the pest.

Restrictions:

DO NOT apply by air.

Allow 7 days between application.

DO NOT make more than 2 applications per growing season.

DO NOT apply more than 800 mL / acre of *Agri-Mek* per season.

DO NOT graze treated crop.

DO NOT enter or allow entry into treated areas for 12 hours following application.

Pre-harvest interval - 14 days.

Storage: Store product in original container only, away from food or feed. Keep container closed.

Precautions:

Agri-Mek is highly toxic to fish and aquatic invertebrates. A buffer zone of 30 metres is required between the last point of direct application and the closest downwind end of sensitive freshwater habitats including lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs, ditches and wetlands.

Agri-Mek is highly toxic to bees exposed to direct treatment or residues on flowering crops and weeds. DO NOT apply this product or allow drift to flowering crops and weeds if bees are visiting the treatment area.

DO NOT contaminate water, food or feed by storage or disposal.

If *Agri-Mek* is to be used on a commodity that may be exported to the U.S. and you require information on acceptable residue levels in the U.S., visit CropLife Canada's website at www.croplife.ca or contact Syngenta Canada Inc. at 1-877-964-3682.

Hazard Rating:

☠ Warning – Poison

For an explanation of the symbols used here see page 11.

Assail

Insecticide Group – 4A
(Refer to page 493)

Company:

Distributed by Engage Agro Corp. (PCP#27128)

Formulation:

Acetamiprid formulated as a wettable powder-70% by weight

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa (seed production only)	Alfalfa plant bug, Lygus bugs (suppression only)
Potato	Colorado potato beetle, aphids

Application:

Ground application only. DO NOT apply by air

Apply with a minimum finished spray volume of 80 litres per acre. For best results uniform spray coverage of the host plants is important.

Begin application when insect levels reach economic thresholds. Use higher rates for heavy infestations, dense foliage or for adult stages of the Colorado potato beetle. Residual control will depend on environmental factors, plant growth, application rate and level of insect infestation.

How it Works:

Assail is a chloronicotinyl insecticide that works by contact or ingestion. It has an anti-feedant effect that can prevent pest damage to host plants prior to the death of the insect. This product rapidly degrades in the soil with no carryover effects.

Restrictions:

DO NOT make more than 2 applications per year per crop.

DO NOT apply more than once every 7 days.

DO NOT exceed a total of 48 g active ingredient (68.8 g product) per acre per season.

DO NOT apply less than 7 days prior to harvest (Preharvest interval).

Buffer Zones: An untreated buffer zone between the last spray swath and the edge of aquatic systems (such as rivers, streams, lakes, and other water bodies) must be established. For groundboom sprayers - 20 metres. DO NOT apply acetamiprid directly to water or to areas where surface water is present. Buffer zone required for sensitive terrestrial areas (grassland, forested areas, shelterbelts, woodlots, hedgerow, rangelands) – 2 metres.

Re-entry Interval: DO NOT re-enter treated areas for a period of 12 hours after application.

Precautions:

DO NOT apply when honey bees are present in the area to be treated as acetamiprid is toxic to honey bees if exposed to direct treatment.

If this product is to be applied to a product destined for export to the United States, information on acceptable residue levels are available at www.croplife.ca.

Storage: DO NOT store in or around the home. Store unused product in a cool, ventilated, dry, locked area. DO NOT allow prolonged storage in areas where temperatures frequently exceed 46 degrees C.

Hazard Rating:

☠ Warning – Poison

For an explanation of the symbols used here see page 11.

Beleaf

Insecticide Group – 9C
(Refer to page 493)

Company:

FMC of Canada (PCP#29796)

Formulation:

50% flonicamid formulated as a water soluble granule

Container size - 1 to 100 kg

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa (seed production only)	Aphids
Potato	Aphids

Application:

DO NOT apply by air.

Ensure the spray system is clean and free of residues from previous applications. Fill the tank half full with clean water. Ensure agitation system is operating and sufficient to provide uniform spray mixing during application and until the spray tank has been emptied. Complete filling to the desired solution volume.

Thorough spray coverage of plant foliage is essential for optimum control. Apply in sufficient water volumes to ensure good coverage - Use a minimum of 38 litres per acre of water. Rates and finished spray volumes should be increased under extreme pest populations or dense plant foliage.

Scout fields and reapply if necessary.

How it Works:

Flonicamid insecticide is a member of the pyridinecarboxamide class of chemistry and controls target pests by contact and ingestion provoking rapid and irreversible feeding cessation.

Restrictions:

Allow a minimum of 7 days between applications.

DO NOT make more than 3 applications per year.

DO NOT apply more than apply more than 64 grams per acre of *Beleaf* per application.

DO NOT apply more than 192 grams per acre of *Beleaf* per season.

DO NOT use *Beleaf* in greenhouses or home gardens.

Re-cropping: There are no plant-back restrictions for potatoes. All other crops may be planted 30 days after the last application of *Beleaf*.

Precautions:

Avoid overnight storage of spray mixture. Prepare only enough spray mixture required for immediate application.

DO NOT use liquid fertilizer as a carrier for *Beleaf* insecticide.

Beleaf insecticide should not be used with spray adjuvants.

Avoid application when heavy rain is forecast.

DO NOT enter or allow entry into treated areas for 12 hours after application.

Storage: Store product in original container, in a secured, dry place separate from other pesticides, fertilizer, food or feed.

Flonicamid is toxic to beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site. Flonicamid is toxic to non-target terrestrial plants. Observe buffer zones for sensitive areas (e.g. aquatic habitats, forested areas) as specified on label directions.

If this product is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's website www.croplife.ca for information on acceptable residue limits.

Hazard Rating:

▽ Caution – Eye irritant

For an explanation of the symbols used here see page 11.

Capture 240 EC

Insecticide Group – 3A
(Refer to page 493)

Company:

FMC Corporation (PCP#31396)

Formulation:

240 g/L bifenthrin formulated as an emulsifiable concentrate.

Container size: 3.78 L jug

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Wireworms (at plant)

Application:

Ground application only. *Capture 240EC* may be applied once per year in Potato as an in-furrow planting time treatment for the control of wireworms. Apply *Capture 240EC* as an in-furrow spray or T-band spray at seeding time. Avoid application when heavy rain is forecast

How it Works:

Bifenthrin is a non-systemic, synthetic pyrethroid which works by contact and ingestion.

Restrictions:

DO NOT apply by air.

Preharvest Interval: Potato – Do not apply within 21 days of harvest.

Re-cropping: Crops appearing on the label may be rotated at any time. Wheat may be rotated 30 days following the final application of bifenthrin. For crops not appearing on the label (except wheat), they may be rotated 365 days following the final application of bifenthrin.

Storage: Store in original container in cool, dry, locked, well-ventilated location.

Others: Toxic to bees, aquatic organisms and small wild animals. Bees may be exposed through direct spray, spray drift, and residues on leaves, pollen and nectar in flowering crops and weeds. Minimize spray drift to reduce harmful effects on bees in habitats close to the application site.

Precautions:

Bifentrin is toxic to bees exposed through direct spray, spray drift and residues on leaves, pollen and nectar in flowering crops and weeds.

Bifenthrin is toxic to aquatic organisms. Observe buffer zones specified on the label.

Re-entry interval (REI) - DO NOT enter or allow worker entry into treated areas for 12 hours.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Chlorpyrifos

Insecticide Group – 1B
(Refer to page 493)

Company:

Dow AgroSciences (*Lorsban 4E* – PCP#14879; *Lorsban NT* – PCP#29650)

ADAMA Canada (*Pyrinex 480EC* – PCP#23705;
FMC of Canada (*Nufos 4E* – PCP#25831)

IPCO (*Citadel 480EC* – PCP#27479)

Loveland Products Canada (*Pyrifos* 15G – PCP#24648;
Warhawk 480EC – PCP#29984)

Farmers of North America (*MPOWER Krypton* – PCP#30985)

Different trade names refer to different companies. Note that products may have different label recommendations. Check your label for more information.

Formulations:

Citadel, Nufos, Lorsban 4E, MPOWER Krypton, Pyrinex and *Warhawk* - 480 g/L chlorpyrifos and *Lorsban NT* - 452 g/L formulated as an emulsifiable concentrate. Container sizes (Note that container sizes may vary between products) - 10 L jug, 115 L returnable container, 208 L drum.

Pyrifos - 15% chlorpyrifos formulated as a granule

Insects Controlled and Registered Crops:

CROP	INSECT
Barley, Oats, Wheat	Army, darksided, pale western and red-backed cutworms, armyworms, grasshoppers
Wheat only	Russian wheat aphid, brown wheat mite, wheat midge
Canola	Darksided, redbacked, variegated, pale western, and army cutworms; bertha army worm, alfalfa looper, armyworm, diamondback moth larvae, grasshoppers, lygus bug
Flax	Darksided, redbacked, variegated, pale western, and army cutworms, armyworm, bertha armyworm
Lentils	Pale western cutworm, grasshoppers
Sunflowers	Redbacked, pale western and army cutworms, sunflower seed weevil (except for *Pyrinex* and *Citadel*)
Corn	Darksided, black and redbacked cutworms
Potato	Wireworms (in-furrow at planting - Pyrinex and Pyrifos only), Colorado potato beetle (larvae), potato flea beetle, tarnished plant bug, redbacked cutworm, black cutworm, darksided cutworm

Application:

Chlorpyrifos may be applied by air or ground equipment except for the following. Ground application only for red-backed cutworm control in corn and sunflower. Ground application only for potatoes.

Pyrifos 15G may be applied by ground only and is to be applied in furrow at planting. Refer to label for specific rates with respect to row spacing.

Uniform coverage of the crop is essential in aerial applications. Apply when insects exceed economic threshold levels and use sufficient water for good coverage. Use higher rates for heavy infestations, mature insects, heavy crop canopy, or under dry soil conditions.

How it Works:

Chlorpyrifos is a broad spectrum, non-systemic insecticide and works by contact, ingestion and vapour action (inhalation).

Effects of Weather:

Avoid application under hot temperatures. Best results will be obtained for wheat midge and cutworms when application is made in evening (after 7 p.m.) or morning (before 8 a.m.). DO NOT apply to plants under extreme drought stress or crop injury may occur.

Tank mixes:

Various chlorpyrifos labels differ. Contact the specific company for supported tank mixes.

Restrictions:

Grazing: Treated cereals grown for cover crop should not be used for human or animal consumption if treated within 60 days of harvest.

Storage: Combustible. DO NOT store near heat or flame. DO NOT store with food, feed, drugs or clothing.

Wheat, barley, oats, canola, corn, flax, lentil, sunflower, potatoes - DO NOT make more than 1 application per season.

Buffer zones around sensitive areas: For all aerial applications, a buffer zone of 100 metres is required for the protection of aquatic habitats.

DO NOT apply directly to water or where runoff could occur to adjacent aquatic sites. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. DO NOT use on flowering crops or weeds. Avoid use when bees are actively foraging.

Precautions:

Chlorpyrifos has a high acute mammalian toxicity. Very toxic to bees, fish, birds, aquatic organisms and other wildlife. May be fatal if swallowed. Causes substantial but temporary eye injury. Harmful if absorbed through skin. May cause skin or eye irritation. Wear protective clothing, impervious gloves and goggles. Wash thoroughly with soap and water after handling and applying. Immediately remove contaminated clothing and wash before re use. DO NOT apply or allow to drift on to workers or other persons.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Closer

Insecticide Group – 4C

(Refer to page 493)

Company:

Dow AgroSciences (PCP#30826)

Formulation:

240 g / L sulfoxaflor formulated as a suspension concentrate.

Container sizes – case contains 12 X 1L containers

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Aphids

Application:

Closer may be applied by ground or air in potatoes. Use low rates for light infestations of target pests and higher rates for moderate to heavy infestations. Apply in sufficient in sufficient solution to ensure thorough coverage of plant foliage. For ground application use a minimum spray volume of 40 L / acre. For aerial application use a minimum spray volume of 12 L / acre.

How it Works:

Closer is a systemic (within the plant) insecticide that causes blockage in the insect's nervous system resulting in paralysis and eventually death, through contact or stomach action.

Restrictions:

DO NOT make more than 2 applications per growing season. DO NOT apply more than 121 mL / acre per growing season. DO NOT make applications less than 7 days apart. DO NOT apply within 7 days of harvest. DO NOT apply this product when flowering weeds are present in the treatment area.

DO NOT apply through any irrigation system.

Plant back interval – A period of 30 days must elapse between treatment of primary crops and the planting of secondary crops not on the *Closer* label.

Re-entry Interval: 12 hours.

Storage: Store product in original container only, away from food or feed. Keep container closed.

Precautions:

DO NOT store or ship with food, feeds, drugs or clothing.

Closer is toxic to bees exposed to direct treatment, drift or residues on flowering crops and weeds. Minimize spray drift to reduce harmful effects on bee in habitats close to the application site. Apply early in the morning or late in the evening when bees are not active.

Closer is toxic to certain beneficial insects. Minimize spray drift to reduce harmful effects on beneficial insects in habitats next to the application site such as hedgerows and woodlands.

Avoid application of *Closer* if heavy rain is forecast. The use of this chemical may result in contamination of groundwater, particularly in areas where soil is permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

If *Closer* is to be used on a commodity that may be exported to the U.S. and you require information on acceptable residue levels in the U.S., visit CropLife Canada's website at www.croplife.ca.

Hazard Rating:

None specified

Clutch

Insecticide Group – 4A
(Refer to page 493)

Company:

Valent Canada Inc. (PCP#29382)

Formulation:

50% clothianidin formulated as a water dispersible granule

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle, aphids, leafhoppers

Application:

In furrow application: Apply as a narrow band in-furrow at planting. For best results, direct spray on the seed pieces or seed potatoes. Use sufficient water volume to ensure uniform coverage and optimal uptake. Use higher rate when extended control is needed. DO NOT apply *Clutch* more than once per season as an in furrow treatment.

Foliar application: May be applied by air or ground. Maximum of 3 foliar applications may be made per crop per season. Application intervals must be at least 10 days apart and must be rotated with an insecticide from a different chemical family. Use sufficient water volume to ensure uniform coverage. Use higher rate when insect populations are high.

How it Works:

Clothianidin is in the neonicotinoid class of insecticides and works by contact or ingestion, with systemic properties that provide residual control. Residual control will depend on environmental factors, plant growth, dosage rate and level of insect infestation.

Restrictions:

DO NOT follow a soil or in furrow application of *Clutch* with a foliar application of *Clutch* or any Group 4 or 4A insecticide.

DO NOT make a foliar application of *Clutch* following a seed piece treatment or in furrow application of *Clutch*, any product containing clothianidin or other neonicotinoid class (Group 4 or 4A) insecticides.

Re-cropping: Acceptable plant-back intervals for:

Canola, corn, potato - no restrictions;
Soybeans - 30 days.

Precautions:

Clothianidin is persistent and may carry over. It is recommended that any products containing clothianidin not be used in areas treated with this product during the previous season.

Avoid application when heavy rain is forecast.

DO NOT enter or allow entry into treated areas for 12 hours after application.

DO NOT graze treated fields or feed treated forage or hay to livestock.

Storage: DO NOT store in or around the home. Store unused product in a cool, ventilated, dry, secure area, away from food and feed.

DO NOT use treated seed pieces for food, feed or fodder.

Clothianidin is highly toxic to bees. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area.

Clothianidin is toxic to beneficial insects, aquatic organisms, birds, small wild mammals and non- target terrestrial plants. Observe buffer zones for sensitive areas (e.g. aquatic habitats, forested areas) as specified on label directions.

DO NOT use this chemical where groundwater contamination can occur, especially in areas where soils are permeable (e.g. sandy) and / or the water table is shallow.

If this product is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's website www.croplife.ca for information on acceptable residue limits.

Hazard Rating:

☠ Caution – Poison

– Eye irritant

For an explanation of the symbols used here see page 11.

Concept

Insecticide Group – 3A, 4A

(Refer to page 493)

Company:

Bayer CropScience Inc. (PCP#29611)

Formulation:

75 g/L imidacloprid and 10 g/L deltamethrin formulated as a suspension concentrate

Container size - 5.26 L jug

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle, aphids, leafhoppers, potato flea beetle, tarnished plant bug, European corn borer (suppression only)
Soybean	Soybean aphid

Application:

Ground application only.

Apply when target pest has reached economic threshold levels. Repeat application if pest populations reach economic thresholds.

Use sufficient water volumes for thorough coverage (i.e. minimum of 40 – 80 litres of water per acre)

For control of tarnished plant bug it is recommended to use *Concept* insecticide only when timing of application coincides with the timing for another pest on the label for potatoes.

How it Works:

Concept insecticide works through contact and systemic activity. Insecticide components: Imidacloprid is a chloronicotinyl, systemic (within the plant) insecticide that works by contact or ingestion. Deltamethrin is a non-systemic pyrethroid insecticide that works through contact and ingestion.

Restrictions:

Allow a minimum of 5 days between applications.

DO NOT make more than 3 applications of *Concept* in a year.

DO NOT apply *Concept* through any type of irrigation equipment.

DO NOT apply *Concept* following a seed treatment or soil application of any Group 4 (neonicotinoid class) insecticide.

A buffer zone of 8 metres is required between the downwind point of application and the closest edge of aquatic habitats.

Re-cropping: Treated areas may be replanted with any crop specified on an imidacloprid label, or any crop for which a tolerance exists for the active ingredient, as soon as practical following the last application.

Acceptable plant-back intervals for:

Cereal grains (wheat, barley, oats) – 30 days

Pea and bean (including fababean, soybean and dry common bean) – 9 months

All other food and feed crops – 12 months

Green manure and other cover crops not intended for human or animal consumption - no plant-back interval required following treatment.

DO NOT graze or harvest cover crops for food or feed.

Precautions:

DO NOT enter or allow entry into treated areas for a period of 24 hours after application of *Concept*.

Concept is highly toxic to fish and other aquatic organisms. DO NOT allow spray drift to come in contact with lakes, streams, rivers, ponds or other aquatic areas including marshes, ponds, ditches, streams, lakes, etc. DO NOT apply *Concept* where runoff is likely to occur and be hazardous to aquatic organisms in neighboring areas.

DO NOT apply *Concept* within 15 metres of well-heads or aquatic systems. DO NOT mix, load or clean equipment within 30 metres of well-heads or aquatic systems.

This product is highly toxic to bees exposed to direct treatment or residues on flowering crops or weeds. DO NOT apply this product or allow it to drift to flowering crops or weeds if bees are visiting the treatment area.

If this product is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's website www.croplife.ca for information on acceptable residue limits.

Storage: DO NOT use or store in or around the home. Store unused product away from feeds, seeds, fertilizer, plants and foodstuffs.

Concept cannot be stored below freezing.

If stored for one year or longer, shake well before using.

Hazard Rating:

Warning – Eye Irritant

☠ deltamethrin: Danger – Poison

☠ imidacloprid: Caution – Poison

For an explanation of the symbols used here see page 11.

Coragen

Insecticide Group – 28
(Refer to page 493)

Company:

E.I. duPont Canada (PCP#28982)

Formulation:

200 g / L chlorantraniliprole formulated as a suspension.

Container sizes - 0.5, 6.0 L, 100 L

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa, sweet clover	Alfalfa weevil (suppression only)
Bean, chickpea, lentil, pea, soybean	Armyworms, corn earworm, cutworms, European corn borer, grasshoppers
Buckwheat	Cutworms, grasshoppers
Canola, mustard, rapeseed	Bertha armyworm, cutworms, diamondback moth, swede midge
Corn	Armyworms, cutworms, corn earworm, European corn borer
Flax	Bertha armyworm, cutworms
Forage grasses (for feed)	Armyworms, grasshoppers
Millet	Armyworms, cutworms, European corn borer, grasshoppers
Pastures	Grasshoppers
Potato	Armyworms, Colorado potato beetle, corn earworm, cutworms, European corn borer
Sunflowers	Cutworms, banded sunflower moth
Wheat, barley, oats, rye	Armyworms, cutworms, grasshoppers

Application:

Coragen may be applied by air or ground equipment.

Begin application when treatment thresholds have been reached. Thorough coverage is essential for optimal control.

Use the high rate under heavy pest pressure and/or when larger larvae are present.

Spray Volume for Potatoes: Apply in a minimum finished spray volume of 40 L/acre by ground. Apply in a minimum finished spray volume of 20 L/acre by air.

How it Works:

Chlorantraniliprole disrupts muscle activity in the insects, resulting in paralysis. Treated pests stop feeding quickly after ingestion, become lethargic and lose mobility.

Restrictions:

DO NOT make more than 4 applications per season on alfalfa (seed production), bean, chickpea, lentil, pea, soybean, potatoes, corn, and forage grasses.

DO NOT make more than 1 application per cutting on alfalfa and sweet clover.

Potatoes, bean, chickpea, lentil, pea, soybean - DO NOT apply more than once every 3 days.

Canola, rapeseed, mustard, flax, sunflower – DO NOT make more than 3 applications per season. DO NOT apply more than once every 5 days.

Corn – DO NOT apply more than once every 7 days.

Wheat, barley, oats, buckwheat, millet – DO NOT make more than 3 applications per season.

DO NOT exceed a total of 455 ml of *Coragen* per acre per season.

Forage (grass), fodder or hay may be fed to livestock.

DO NOT make a foliar application of DuPont *Coragen* insecticide for a minimum of 60 days following an in-furrow or soil application or planting of seed or seed pieces treated with any Group 28 insecticide.

Re-entry Interval: 12 hours.

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed. Not for use or storage in or around the home. Keep container closed.

Precautions:

Coragen is toxic to aquatic organisms. Observe buffer zones specified on the label.

The use of this chemical may result in contamination of groundwater, particularly in areas where soil is permeable (e.g. sandy soil) and/or the depth to the water table is shallow.

To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay.

Avoid application when heavy rain is forecast.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

Very low toxicity to mammals. Keep out of reach of children.

Cypermethrin

Insecticide Group – 3A

(Refer to page 493)

Company:

Engage Agro corporation (*Mako Insecticide* – PCP#30316)
United Phosphorous, Inc. (*UP-Cyde 2.5 EC* – PCP#28795)

Formulation:

cypermethrin formulated as an emulsifiable concentrate. (*Mako Insecticide* – 407 g/L; *UP-Cyde 2.5 EC* – 250 g/L)

Container size - 1, 3.79, 5, 10 L

Insects Controlled and Registered Crops:

CROP	INSECT
Wheat, barley	Grasshoppers, cutworms
Canola, rapeseed, mustard	Grasshoppers, flea beetles, bertha armyworm
Roadsides, headlands, summerfallow	Grasshoppers
Sunflower	Sunflower beetle, Sunflower seed weevils
Corn	European corn borer, cutworms, corn earworm
Potato	Colorado potato beetle, flea beetle, leafhoppers, tarnished plant bug, cutworms

Application:

May be applied by ground application only for control of immature (up to 4th instar) grasshoppers on wheat, barley, roadsides, headlands and canola; for flea beetle control on canola and mustard; and for control of cutworms. After application for cutworms leave soil surface undisturbed for 5 days.

May be applied by ground or air for bertha armyworm in canola, sunflower beetle, sunflower seed weevil in sunflower, corn earworm, European corn borer in corn and Colorado potato beetle, flea beetle, leafhoppers and tarnished plant bug on potatoes.

Apply when insect numbers exceed economic threshold levels and use sufficient water for good coverage. Use higher rates for mature insect stages (grasshoppers) or severe infestations.

How it Works:

Ripcord and *UP-Cyde* are pyrethroid insecticides that work as a contact and stomach poison.

Effects of Weather:

Activity of cypermethrin on grasshoppers is reduced as soil temperature increases. Application for grasshopper control should be made at temperatures below 25°C. Spraying for grasshoppers should be delayed until evening if daytime temperatures are above 25°C.

Restrictions:

Grazing: Treated crops must not be grazed or cut for hay except field corn silage derived from corn treated with *Up-Cyde* at the recommended rate and pre-harvest interval may be fed to lactating dairy cattle and beef cattle.

Storage: Keep in original container during storage. DO NOT contaminate or store near foodstuffs.

Re-entry Interval (REI): 12 hours.

Buffer zones: DO NOT apply by ground equipment within 15 m of water or waterfowl habitats. For aerial application a buffer zone of 100 metres must be left around environmentally sensitive areas such as ponds, stream, rivers, dugouts and wetlands.

Canola, Rapeseed, Mustard - *Mako* may only be applied by ground for flea beetles. Cypermethrin must be applied be applied by ground for grasshoppers.
DO NOT apply cypermethrin more than once per season by air.
DO NOT apply *Up-Cyde* to mustard by air.
Pre-harvest interval - 30 days

Corn - DO NOT apply more than a maximum of 3 applications by ground. DO NOT make more than 2 aerial applications per season. Repeat as necessary with 4 to 7 day intervals between applications.
Pre-harvest interval - 5 days

Potatoes - Ground - Apply as required with 10 to 12 day intervals up to a maximum of 3 applications per season. Air - up to 2 applications per season.
Pre-harvest interval - 7 days

Sunflower - Ground - Apply when required with a 5 day interval between applications. A maximum of 2 applications per season. Air - 1 aerial application is permitted per season.
Pre-harvest interval - 70 days

Pre- harvest intervals - Wheat - 30 days; Barley - 45 days

Precautions:

Cypermethrin is of low to moderate acute mammalian toxicity and very toxic to bees, fish, and aquatic organisms. Harmful or fatal if swallowed. May be harmful if absorbed through skin.

Severely irritating to eyes. Causes skin irritation and sensitization. Wear longsleeved protective clothing and gloves when handling or applying. Wear face shield or goggles when mixing. DO NOT apply where streams, lakes and ponds may be contaminated. Avoid spraying when bees are foraging.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Decis

Insecticide Group – 3A
(Refer to page 493)

Company:

Bayer CropScience (PCP#17734)

Formulations:

50 g/L deltamethrin formulated as an emulsifiable concentrate.

Container sizes: *Decis 5EC* - 2.4 L and 9.6 L jugs

Insects Controlled and Registered Crops:

CROPS	INSECT
Alfalfa (seed crops only)	Lygus bugs, alfalfa weevil
Field corn	European corn borer
Potato	Colorado potato beetle, potato flea beetle, Lygus bugs, leafhoppers
Canola, rapeseed, mustard (condiment and oilseed quality *Brassica juncea* varieties)	Flea beetles, clover cutworm, bertha armyworm, diamondback moth, beet webworm, cabbage seedpod weevil (adults only), Lygus bugs, grasshoppers (canola only)
Sunflower	Sunflower beetle
Wheat, barley, oats, lentils	Cutworms, grasshoppers
Rangeland, pastures, roadside, fence row	Grasshoppers
Flax	Cutworms, beet webworm, grasshoppers
Red clover (seed production only)	Lesser clover leaf weevil (suppression only)

Application:

Decis may be applied by air or ground equipment to all crops with the exception of alfalfa, red clover and corn, which require ground application only. Apply when insects exceed economic threshold numbers with sufficient water for good coverage. Use higher rates for severe infestations, on dense foliage or when a number of insect growth stages are present.

Alfalfa (seed production) - Use higher rates if alfalfa weevil present.

Tank Mixes:

When in a tank-mix the spray mixture must be constantly agitated throughout application. Do not allow the spray mixture to stand in the spray tank for more than 4 hours after mixing.

Decis may be tank mixed with the following herbicides: *Pardner, Buctril M, Banvel, MCPA, 2,4-D, Puma*^{120} *Super*. Tank mixes with *Puma*^{120}*Super* or *Puma*^{120}*Super plus Buctril M* are for use in spring and durum wheat only.

Bayer CropScience also supports the following mixes that are not on the *Decis* label. Apply mixes according to the most restrictive use limitations for either product:

Herbicides – Glyphosate, *Odyssey* and *Solo*

Fungicides – *Headline, Lance, Tilt*

When a tank mix is used the labels of the tank mix partners are to be consulted.

How it Works:

Decis is a non-systemic, synthetic pyrethroid which works by contact and ingestion.

Effects of Weather:

DO NOT spray under a strong temperature inversion, or when temperature exceeds 25°C as this will result in a reduction in control. Best control will be achieved when *Decis* is applied during cooler periods of the day. DO NOT apply within 1 hour of rain.

Restrictions:

Alfalfa seed production – DO NOT apply more than once per year.

Canola – May be applied by ground or air. DO NOT apply more than once per season.

Corn – DO NOT apply more than 3 times per year

Potato – (Ground) DO NOT apply more than 3 times per year. (Aerial) DO NOT apply more than 2 times per year. May be used only once per season on high organic (muck) soils.

Red clover – DO NOT apply by air. DO NOT make more than 2 applications per year. DO NOT use treated crop for feed or forage. Restricted entry interval – 12 hours

Wheat, barley, oats, flax, lentil – (Ground) DO NOT apply more than 3 times per year. (Aerial) DO NOT apply more than 2 times per year.

Storage: DO NOT store below freezing. DO NOT store near feed, food, seeds or fertilizer. Keep away from heat, sparks and open flames. If stored for 1 year or longer, shake well before using.

Others: Ground application - Observe a 16 yard (15 m) buffer zone from environmentally sensitive areas (for example, wetlands, sloughs, rivers, houses, farm buildings).

Aerial application – Leave a 110 yard (100m) buffer zone. DO NOT apply *Decis* by air when the wind speed exceeds 8 kph. In soils with high organic content (muck soils), *Decis 5 EC* should be applied only once during each crop year, prior to August 1, and at rates of no more than 80 mL/acre.

Precautions:

Decis is of high mammalian toxicity and is a severe eye and skin irritant. Avoid contacting or breathing spray mist. This product contains petroleum distillates which are moderately to highly toxic to aquatic organisms and fish. *Decis* is toxic to bees and other beneficial insects. Avoid spraying when bees are foraging. Wear protective clothing, including goggles and respirator, when handling or spraying. DO NOT contaminate or store near feed or foodstuffs. Wash thoroughly after using *Decis*.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Delegate

Insecticide Group – 5

(Refer to page 493)

Company:

Dow AgroSciences (PCP# 28778)

Formulations:

25% spinetoram formulated as wettable granules.

Container size - 840 g

Insects Controlled and Registered Crops:

CROP	INSECT
Potato*	Colorado potato beetle (time for egg hatch or small larvae), European corn borer (time to coincide with peak egg hatch)
Wheat, barley, oats, rye**	Armyworm (when economic thresholds dictate)
Soybean	Armyworms

* Maximum 3 applications per year with a minimum retreatment interval of 7 days

** Maximum 3 applications per year with a minimum retreatment interval of 5 days

Application:

Apply by ground only in sufficient water volume to cover the entire plant using a combination of nozzles and pressure designed to deliver thorough, even coverage with ***ASABE fine classification*** droplets. DO NOT apply through irrigation systems.

How it Works:

Delegate is derived from the fermentation of the bacterium *Saccharopolyspora spinosa*, which is then chemically modified to create the active ingredient. Spinetoram affects the insect nervous system. It does not interact with the known binding sites of other classes of insecticides. It works through ingestion or contact with the target insects. Target insects cease feeding within a few minutes, although death may take a few days.

Tank Mixes:

DO NOT mix this product with any other pesticide or fertilizer.

Restrictions:

Re-entry: DO NOT enter treated field for 12 hours.

Preharvest: DO NOT harvest within 21 days of application for wheat (spring and durum, barley, oats and rye) or within 7 days for potato.

Grazing: No restrictions indicated.

Aerial Application: DO NOT apply by air.

Storage: Store in a cool, dry place. Keep from freezing.

Precautions: Delegate is toxic to bees, small wild mammals, aquatic organisms and non-target terrestrial plants, and may be toxic to certain beneficial insects exposed to direct treatment, drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds if bees are visiting the treatment area. Minimize spray drift to reduce harmful effects on bees, and other beneficial insects or small mammals in habitats next to the application site such as hedgerows and woodlands.

Buffer Zones:

Application method	Buffer Zones (metres[†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground *	10	5	1

See page 36 for an explanation of the different habitats.

* Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Tank Cleaning:

Refer to page 15.

Hazard Rating:

No specific hazard rating specified.

For an explanation of the symbols used here see page 11.

Dibrom

Insecticide Group – 1B
(Refer to page 493)

Company:

Loveland Products Canada (PCP#7442)

Formulations:

900 g/L naled formulated as an emulsifiable concentrate.

Container size - 4 x 3.78 L jugs per case and 2 x 9.46 L jugs per case

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa, clover, vetch	Aphids, loopers, leafhoppers, Lygus bugs
Beans	Alfalfa looper, aphids
Potatoes	Flea beetles, Colorado potato beetles, leafhoppers
Rangeland, field areas and pastures.	Grasshoppers

Application:

Apply *Dibrom* by ground or air. Use designated amounts in full volumes of water. For ground application use 40-120 L of water per acre. For aerial use 4 - 12 L of water per acre unless otherwise stated.

How it Works:

Dibrom is an organophosphate insecticide. It acts as a contact and stomach poison.

Effects of Weather:

DO NOT apply *Dibrom* when air temperature is greater than 32°C.

Restrictions:

Environment: DO NOT contaminate any body of water, waterway or water source. *Dibrom* is moderately to highly toxic to birds, aquatic animals and other wildlife.

Re-entry interval: DO NOT enter or allow worker re-entry into treated area for 48 hours following application.

DO NOT apply more than 2 times per season.

Precautions:

Concentrate may cause skin damage. DO NOT get on skin, eyes or clothing. Use waterproof gloves and face shield or goggles when handling concentrate. Harmful if swallowed. Avoid breathing spray mist.

Avoid contamination of feed, foodstuffs and drinking water.

Highly toxic to bees. Avoid application during periods of bee activity.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Dimethoate

Insecticide Group – 1B
(Refer to page 493)

Company:

IPCO (*Cygon 480 EC* – PCP#9807)
FMC of Canada (*Cygon 480-Ag* – PCP#25651)
Loveland Products Canada (*Lagon 480E* – PCP#9382)

Different trade names refer to different companies. Note that products may have different label recommendations. Check your label for more information.

Formulations:

Cygon/Lagon - 480 g/L dimethoate formulated as an emulsifiable concentrate. Container size - 10 L.

Insects Controlled and Registered Crops:

CROP	*Cygon 480-Ag* INSECT	*Lagon 480E* INSECT	*Cygon 480 EC* INSECT
Peas		Aphids	Aphids
Potatoes (ground application only)	Aphids, leafhoppers	Aphids, leafhoppers, Lygus bugs	Aphids leafhoppers, Lygus bugs
Alfalfa *(rates vary for seed and forage production)	Aphids, leafhoppers, Lygus bugs*, plant bugs*, alfalfa blotch leaf miner, grasshoppers, reduction of alfalfa weevil larvae	Aphids, leafhoppers, alfalfa blotch leafminers, grasshoppers, reduction of alfalfa weevil larvae, Lygus bugs*, plant bugs*	Aphids, blotch leafminer, grasshoppers, leafhoppers, Lygus bugs,*plant bugs*, sweet clover weevil, reduction of alfalfa weevil larvae
Canaryseed	Aphids	Aphids	Aphids
Canola/rapeseed	Aphids, leafhoppers, grasshoppers	Aphids, leafhoppers, grasshoppers	Aphids, leafhoppers, grasshoppers
Forage crops	Lygus bugs, plant bugs, grasshoppers	Grasshoppers, aphids (suppression only of Russian wheat aphid), Lygus bugs,and plant bugs	Aphids, grasshoppers, leafhoppers, Lygus bugs, plant bugs, reduction of alfalfa weevil larvae
Sweet clover, red clover, alsike clover	Sweet clover weevil	Sweet clover weevil	Sweet clover weevil
Pastures, waste areas	Grasshoppers	Grasshoppers	Grasshoppers
Wheat	Wheat midge, thrips, aphids (suppression only of Russian wheat aphid)	Thrips, grasshoppers, wheat midge, Russian wheat aphid	Wheat midge, aphids, thrips, grasshoppers
Barley, oats	Thrips, aphids (suppression only of Russian wheat aphid)	Thrips, grasshoppers,	Aphids, thrips, grasshoppers
Flax	Aphids	Aphids	Aphids

CROP	*Cygon 480-Ag* INSECT	*Lagon 480E* INSECT	*Cygon 480 EC* INSECT
Rye		Grasshoppers	Grasshoppers
Soybeans		Aphids, leafhoppers, Lygus bugs, spider mites	Aphids, leafhoppers, Lygus bugs, spider mites

Application:

May be applied by air or ground equipment (unless otherwise specified above). Apply when insects exceed economic threshold numbers and use sufficient water for good coverage. Use higher rates for adult insects, heavy infestations or dense canopy.

How it Works:

Dimethoate is a broad spectrum, systemic (within the plant) and contact, organophosphate insecticide and acaricide.

Restrictions:

Grazing: Remove cattle prior to spraying. Read label carefully to determine livestock re-entry period.

Storage: Store at temperatures between 4°C and 30°C and in areas away from feed and food.

Others: DO NOT treat when bees are foraging. DO NOT apply to alfalfa in bloom. Read label carefully to determine maximum number of applications per season. Wait at least 10 days before placing leafcutter bees in treated fields.

Precautions:

Dimethoate is of high acute mammalian toxicity and is highly toxic to birds, bees and other animals. Wear a respirator, goggles, rubber gloves, rubber boots and coveralls when handling concentrate. Avoid contact with skin and eyes. DO NOT inhale spray mist.

Hazard Rating:

☠ Warning Poison – *Lagon, Cygon 480 AG*

☠ Danger Poison – *Cygon 480 EC*

For an explanation of the symbols used here see page 11.

Dipel 2X DF

Insecticide Group – 11
(Refer to page 493)

Company:

Valent BioSciences (PCP#26508)

Formulation:

Bacillus thuringiensis var. Kurstaki strain ABTS-351 fermentation solids, spores and insecticidal toxins - 57.0%

Potency: 32,000 Cabbage Looper Units (CLU) per mg (32 billion CLU per Kg)

Insects Controlled and Registered Crops:

CROP	INSECT
Sunflower	Sunflower moth
Timothy	Essex (European) skipper
Corn	European corn borer larvae
Potato	Cabbage loopers

Application:

Treat when larvae are young (early instars) before the crop is damaged. A spreader sticker such as *Triton B1956* should be used to give thorough foliage coverage.

How it Works:

Dipel is a biological stomach insecticide resulting in the larvae ceasing to eat in a few hours, with death usually occurring within 1-3 days.

Restrictions:

Storage: Store at temperatures between 0° and 25°C (cooler temperatures preferable).

Others: DO NOT allow dilute spray to stand in tank for more than 12 hours. Use product within 24 months of date of manufacture if stored at cool temperatures. Final spray solution for *Dipel* should have a pH of 5-7.

Precautions:

Harmful if swallowed, inhaled, or absorbed through the skin. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, or clothing. In case of contact with eyes or skin, immediately flush eyes or skin with plenty of water.

Hazard Rating:

Warning contains the allergen soy

⚠ Caution – eye irritant, skin irritant, potential sensitize

Eco Bran

Insecticide Group – 1A
(Refer to page 493)

Company:

Peacock Industries (PCP#25815)

Formulation:

Wheat bran infused with carbaryl insecticide.

Container size - 20 kg bag; 1kg bottle

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa, beans, clover, corn, oats, rye, wheat, barley, canola, pastures, rangelands, forage grasses, field borders, headlands, rights-of-way, roadsides, wastelands	Grasshoppers

Preharvest Intervals and Livestock Re-entry Periods:

Crop	Preharvest Interval/ Livestock re-entry period
Corn	1
Alfalfa, clover	2
Beans	5
Oats, rye, wheat	14
Barley	28
Canola	Treat only seedlings
Field borders, headlands, rights-of-way, roadsides, wastelands	0
Entry of beef cattle or other livestock to pastures, rangelands or forage grasses	1
Entry of dairy cattle to pastures or rangelands, harvest of forage crops	2

Application:

For ground application only. DO NOT apply by air.

Broadcast application may be made with spreaders, hand applicators, or by hand. Use gloves and wash thoroughly following application. More information on application and applicators can be found at: http://www.grasshoppercontrol.com

Restrictions:

DO NOT apply within 50m of sloughs, ponds, streams, dugouts or open water. Apply when winds are between 3-8 kph and do not favour drift.

Presence of product on flowering crops such as alfalfa and clover will not harm foraging honey or leafcutter bees.

May be used in pastures while beef cattle are grazing.

Precautions:

Harmful if inhaled or swallowed. Avoid breathing dust or vapour from bait. Use only in well-ventilated areas. May cause eye irritation. Avoid contact with eyes and skin. Wash thoroughly after handling and before eating or smoking. Avoid contamination of feed and foodstuffs. Keep away from heat, sparks and open flame.

Endosulfan

Insecticide Group – 2A
(Refer to page 493)

Company:

ADAMA (*Thionex EC* – PCP#23453)

Last date of sale for Endosulfan products is December 31, 2015.

Last date of use for Endosulfan products is December 31, 2016.

Formulation:

Thionex - 400 g / L endosulfan formulated as an emulsifiable concentrate. Container size - 10 L

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Aphid, Colorado potato beetle, flea beetle, leafhoppers

Application:

Ground application only. Apply when insect numbers exceed economic threshold levels and use sufficient water for good coverage.

How it Works:

Endosulfan is an organochlorine insecticide that works as a contact and stomach poison.

Tank Mixes:

Compatible with most commonly used insecticides and fungicides, except Bordeaux mixture and hydrated lime.

Restrictions:

Grazing: DO NOT feed treated crop residue to livestock.

Storage: DO NOT store below freezing. If stored one year or longer, shake well before using.

Others: On sunflowers, DO NOT make more than 1 application per season.

Precautions:

Endosulfan is of high, acute mammalian toxicity and is toxic to bees. Highly toxic to fish. Hazardous if swallowed, inhaled or absorbed through the skin. Wear synthetic rubber gloves and approved respirator in prolonged spray-mixing and loading operations. DO NOT apply or allow spray drift to areas occupied by unprotected persons and animals or onto streams, lakes or ponds.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Entrust 80 W

Insecticide Group – 5
(Refer to page 493)

Company:

Dow AgroSciences (PCP# 27825)

Formulation:

80% spinosad

Container size - 4 x 113.4 g packets

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle larvae and European corn borer larvae

Application:

Apply *Entrust 80 W* as a foliar spray by ground only. Apply when scouting indicates the target pest species have reached economic threshold levels. For Colorado potato beetle larvae, target eggs at hatch or small larvae. For control of European corn borer, time the application to coincide with peak egg hatch. Use higher application rate for higher pest pressure or when extended egg hatch is anticipated. If pest populations persist, a repeat application 7 to 10 days after the initial application may be necessary.

How it works:

Entrust 80 W is in the spinosine class of insecticides. It is a contact and stomach insecticide. It is derived from the fermentation of *Saccharpolyspora spinosa*.

Effects of weather:

This product has the potential for run-off. Do not spray immediately after a rainfall or if rain is forecast within 48 hours after application.

Restrictions:

Storage: Avoid freezing. DO NOT store or ship with food, feeds, drugs or clothing.

Others: DO NOT make more than 2 applications per season (maximum of 60 g / acre).

Precautions:

Entrust 80 W is highly toxic to honey bees exposed to direct spray. Avoid spraying on crops in bloom or other vegetation when bees are actively foraging. This product is toxic to other beneficial parasites and predators. DO NOT contaminate aquatic habitats such as ponds, lakes, rivers, streams and wetlands during application or when rinsing equipment and containers.

Buffer Zones: A buffer zone of 2 metres (early season) or 1 metre (late season) is required between downwind edge of spray boom and sensitive aquatic habitats.

Avoid contact with eyes, skin, and clothing.

DO NOT enter or allow worker entry into treated areas for a period of 12 hours after application.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Fulfill

Insecticide Group – 9B
(Refer to page 493)

Company:

Syngenta Canada (PCP#27274)

Formulation:

50% pymetrozine formulated as a wettable granule
Container size – 6 X 780 g

Insects Controlled and Registered Crop:

CROP	INSECT
Potatoes	Aphids including: green peach, potato, foxglove, buckthorn

Application:

May be applied by ground or air. Apply *Fulfill* to plant foliage. Thorough spray coverage is essential for best performance. Apply *Fulfill* with sufficient water (minimum of 40 L/acre) to ensure good coverage of all plant surfaces. Higher water volumes will generally result in better coverage, especially under adverse conditions (hot, dry), where a dense plant canopy exists and/or aphid infestations are high. One additional application may be needed to control persistent aphid populations. Allow a minimum of 7 days between applications.

DO NOT apply *Fulfill* insecticide through chemigation.

DO NOT use in nurseries or in plant propagation houses, or on any plants grown for use as transplants.

The use of a non-ionic adjuvant is recommended to improve the performance of *Fulfill* insecticide under drought stress conditions.

How it Works:

Fulfill is a systemic insecticide and works primarily by ingestion and but has some contact activity. Affected aphids stop feeding shortly after exposure, but may remain on the plant foliage until they die, which is usually within 2-4 days. *Fulfill* insecticide has residual activity in the plant and will control aphids that move onto the plant after spraying.

Fulfill has shown no phytotoxicity on the varieties of potato tested when applied at the label rates.

Effects of Weather:

Fulfill insecticide exhibits movement through the leaf surface into plant tissue and is rainfast as soon as the spray solution has dried.

Restrictions:

Storage: Store in a cool, dry, place away from food, drinks, and animal feeding stuffs. Keep in the original container tightly closed.

Others: DO NOT apply by air. DO NOT exceed 2 applications (152 g product/acre) per crop per season. DO NOT apply directly to aquatic systems, permanent water bodies or areas where surface water is present. DO NOT contaminate water when cleaning equipment or disposing of equipment wash water.

A re-cropping restriction of 30 days is required for all crops.

Precautions:

May cause skin sensitization reactions. Applicators and other handlers must wear personal protective equipment including, long-sleeved shirt, long pants, waterproof gloves and shoes plus socks. DO NOT enter or allow entry into treated areas for 12 hours. DO NOT use, pour, spill, or store near heat or open flame.

Hazard Rating:

▽ Caution – Poison

For an explanation of the symbols used here see page 11.

Imidacloprid

Insecticide Group – 4A
(Refer to page 493)

Company:

Bayer CropScience (*Admire 240* – PCP#24094; *Admire SPT* – PCP#27702)

FMC of Canada (*Grapple* – PCP#28726 / *Grapple*$_2$ – PCP#29048)

ADAMA Canada (*Alias 240 SC* – PCP#28475)

Formulation:

240 g/L imidacloprid formulated as a suspension concentrate.

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle, aphids, potato leafhopper, potato flea beetle

Application:

Soil application: (*Admire 240 / Alias 240 SC / Grapple / Grapple*$_2$) Apply as a narrow band in-furrow. For best results, direct spray on the seed pieces in the furrow. Scout potato fields frequently, especially during warmer part of growing season. If pest populations exceed economic thresholds apply a recommended foliar insecticide with a different mode of action than imidacloprid.

Seed piece treatment: (*Admire SPT / Admire 240 / Alias 240 SC / Grapple / Grapple*$_2$) Refer to Imidacloprid in the seed treatments product pages.

Foliar application: (*Admire 240 / Alias 240 SC / Grapple / Grapple*$_2$) Apply only if insect populations exceed recommended economic thresholds. For optimum control, good coverage of the foliage is needed. A maximum of 2 foliar applications may be made per crop per season. Scout fields and retreat if needed. For aphids, two applications at least seven days apart may be required to achieve control. DO NOT make a foliar application following a soil or seed treatment of the product in the same crop. Allow at least 7 days after the last application and before harvesting the crop.

How it Works:

Imidacloprid is a chloronicotinyl, systemic (within the plant) insecticide that works by contact or ingestion. Control period may vary due to climate and soil conditions

Restrictions:

DO NOT apply by air

DO NOT apply more than once per season as a soil application.

DO NOT follow a soil application with a foliar application.

Re-cropping: Acceptable plant-back intervals for:

Cereal grains (wheat, barley, oats) - minimum 30 days

Peas and beans - 9 months

All other food and feed crops - 12 months

Green manure and other cover crops can be grown without plant-back intervals but cannot be grazed or harvested for food or feed.

DO NOT apply in fields where imidacloprid has been used during the previous season.

DO NOT apply through any irrigation system.

Precautions:

DO NOT re-enter treated areas for 24 hours after foliar application.

Avoid application when heavy rain is forecast.

DO NOT apply product or plant treated seed pieces within 15 metres of well-heads or aquatic systems, including marshes, ponds, ditches, reservoirs, streams, lakes, etc.

DO NOT mix, load or clean spray equipment within 30 metres of well-heads or freshwater habitats.

For application with air-blast equipment, DO NOT apply within 40 metres of well-heads or aquatic systems.

The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (e.g. sandy soil) and / or where the water table is shallow.

Storage: DO NOT store in or around the home. Store unused product in a cool, ventilated, dry, locked area and avoid cross-contamination with other pesticides, fertilizers, food and feed.

DO NOT use treated seed pieces for food, feed or fodder.

Imidacloprid is highly toxic to bees exposed to direct treatment or residues on flowering crops or weeds.

Highly toxic to aquatic invertebrates and birds.

If this product is to be applied to a product destined for export to the United States, contact 1-866-375-4648 or www.croplife.ca.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Imidan

Insecticide Group – 1B
(Refer to page 493)

Company:

Gowan Canada (PCP#29064)

Formulation:

70% phosmet formulated as a wettable powder in water soluble sachets.

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa	Alfalfa weevil, alfalfa blotch leafminer
Potato	Colorado potato beetle, potato flea beetle, potato leafhopper, potato aphid

Application:

Apply by ground only.

Imidan 70-WP instapak is packaged in water soluble sachets that are to be dropped into the spray tank unopened. DO NOT use in low-volume, gear-type spray equipment.

How it Works:

Imidan is an organophosphate insecticide.

Restrictions:

Storage: Keep sachets dry and DO NOT allow sachets to contact any moist surface prior to adding to spray tank. Keep water soluble sachets in the protective container and store in a cool, dry place. DO NOT store at temperatures above 40°C.

Toxic to bees exposed to direct treatment, spray drift or residues on flowering crops or weeds. DO NOT apply this product to flowering crops or weeds.

Buffer zones required for the protection of freshwater habitat Depth of less than 1 metre - 15 metres and for depths greater than 1 metre - 4 metres.

DO NOT apply more than once per cutting or within 7 days of harvest.

DO NOT make more than 3 applications per season.

Re-entry Interval (REI): 5 days

Precautions:

Harmful if swallowed, inhaled or absorbed through the skin. Wear protective clothing, including rubber gloves and goggles, during mixing, loading and spraying.

Imidan is toxic to fish and bees. Keep away from any body of water.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Lambda-cyhalothrin

Insecticide Group – 3A
(Refer to page 493)

Company:

Syngenta Canada (*Matador* – PCP#24984)
ADAMA Canada (*Silencer 120 EC* – PCP#29052)

Formulations:

120g/L lambda-cyhalothrin formulated as an emulsifiable concentrate Container size - 4 x 3.78 L.

Insects Controlled and Registered Crops:

CROP	INSECT
Potatoes	Colorado potato beetle, European corn borer, Lygus bugs, potato flea beetle, potato leafhopper, tuber flea beetle, armyworm
Canola, mustard	Crucifer flea beetle, grasshoppers, Lygus bug, cabbage seedpod weevil (adults), cabbage looper, diamondback moth larvae, imported cabbageworm, bertha armyworm, swede midge, cutworms (*Matador* only)
Sunflower	Lygus bugs (*Matador* only), sunflower beetle
Wheat, barley, oats	Grasshoppers, armyworm
Alfalfa, unimproved pasture	Grasshoppers
Summerfallow (Matador only)	Grasshoppers
Flax	Grasshoppers, cutworms (*Matador* only)
Alfalfa Matador – Ground or Air Silencer – Ground only	Alfalfa weevil, Lygus bugs, pea aphid, potato leafhopper
Corn	European corn borer, corn earworm, cutworms, fall armyworm, armyworm
Beans	Cutworms, corn borer, potato leafhopper, Lygus bugs
Chickpeas	Grasshoppers, potato leafhopper, cutworms
Fababeans (broad beans)	Lygus bugs, potato leafhopper, pea aphid
Lentils	Cutworms, grasshoppers, Lygus bugs, pea aphids, potato leafhopper
Peas	Cutworms, grasshoppers, pea aphids, pea leaf weevil
Soybeans	Cutworms, grasshoppers, Lygus bugs, aphids
Timothy	Grasshoppers

Application:

Aerial:

Matador and Silencer: Canola, mustard, sunflower, flax, alfalfa, unimproved pasture -DO NOT make more than 1 application at the 33.2 ml/acre rate per year.

Corn, wheat, barley, oats, potatoes, soybean, dry edible bean, pea, chickpea, lentil, favabean - DO NOT make more than 2 applications at the 33.2 ml/ac rate per year.

Matador: Summerfallow - DO NOT make more than 1 application at the 33.2 ml/acre rate per year.

Ground:

Canola, mustard, sunflower, flax, alfalfa, unimproved pasture, summerfallow (Matador only), corn, wheat, barley, oats - DO NOT make more than 3 applications per year at the 33.2 ml/acre rate.

Potatoes - DO NOT make more than 3 applications per year at the 33.2 ml/acre rate. DO NOT make more than 2 applications per year if using the 50 ml/acre rate. DO NOT exceed 100 ml/acre of lambda-cyhalothrin per year.

Beans, chickpeas, favabeans, lentils, peas, soybeans- DO NOT make more than 3 applications per year. DO NOT graze or harvest treated forage straw or hay for livestock feed.

Timing:

For potato insects, timing of application should be based on the presence of vulnerable pest developmental stages and significant populations as determined by local monitoring.

For sunflower beetles, use the high rate to control adults.

For flea beetles, to prevent migration of over-wintering adults throughout the field, spray a 15 m strip around the field at the first sign of flea beetle feeding.

For grasshoppers, apply the low rate when grasshoppers are up to the 3rd nymphal stage (up to 1 cm in length) or when insect numbers are low. Apply the high rate when insects are larger, up to but not including, winged adults or when insect numbers are high.

For corn borer control apply *Matador* before the larva bores into the plant stalk or pods

How it Works:

Lambda-cyhalothrin is a synthetic pyrethroid insecticide. It is a fast acting stomach and contact insecticide effective against a broad spectrum of foliar pests. It has no fumigant or systemic activity.

Effects of Weather:

For best results, apply Lambda-cyhalothrin during the early morning before temperatures rise, and during the evening, past the heat of the day.

Tank Mixes:

Herbicides: (Ground only)
Horizon
Tralkoxydim ^Δ^
Fungicides: (Tank mixes on legumes (bean, chickpea, lentil, pea, soybean) may be applied by ground only) Refer to label for other crops.
Propiconazole Δ
Allegro in dry bean
Quadris (*Matador* only)
Quilt (*Matador* only)
Headline (*Silencer* only) on dry field pea- to control insects and diseases listed on the label of each product. Read carefully and follow all use directions and use precautions on both the *Silencer 120 EC* and *Headline EC* Fungicide labels. Failure to follow the rates of use and timing of application as recommended for each product will result in unsatisfactory control of target pest.
Touchdown Total and *Traxion*

Δ Manufacturers may only support specific mixes. Contact the manufacturer for more information.

Restrictions:

Grazing: DO NOT graze or feed lactating dairy animals on treated green cereal forage or treated pasture. DO NOT apply within 14 days of livestock foraging.

Alfalfa seed from treated crops is not to be used for production of "alfalfa sprouts" for human consumption.

Storage: Store above 0 degrees C. Storage below 0 degrees C will not impair the effectiveness of Lambda-cyhalothrin. However, following such storage, agitate well before use.

Others: Allow a 7-day interval between applications. DO NOT apply within 15 m of productive fisheries, water or waterfowl habitat.

Buffer Zones:

Application method	Crop	Buffer Zones (metres †) Required for the Protection of:	
		Aquatic Habitats of Depths	
		Less than 1 m	Greater than 1 m
Ground	All field crops	15	15
Fixed wing airplane	Potatoes, oilseed crops, cereal crops, alfalfa, unimproved pasture, summerfallow	100	20
	corn	225	20
	Legume vegetables	600	25

See page 36 for an explanation of the different habitats.

- Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.
- For tank mixes, consult the labels of the tank mix partners and observe the largest (most restrictive) buffer zone of the products involved in the tank mixture.

† Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

Precautions:

Lambda-cyhalothrin has potential for skin and eye irritation. Avoid splashing in eyes or on skin, particularly the face. If hands are contaminated, wash with soap and water before touching other areas of skin. This product is very toxic to bees. Avoid spraying when bees are foraging. Spray deposits should be dry before bees commence foraging in treated crops.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Lannate

Insecticide Group – 1A
(Refer to page 493)

Company:

E.I. duPont Canada (PCP# 10868)

Formulations:

90% methomyl formulated as a water soluble powder. Container size - 24 x 225 gram water soluble bags.

Insects Controlled and Registered Crops:

CROP	INSECT
Canola	Alfalfa looper, bertha armyworm, clover cutworm, beet webworm
Flax	Bertha armyworm
Peas	Alfalfa looper, pea aphid
Wheat, oats, barley	Armyworm, thrips
Potato	Aphids, leafhoppers, flea beetles, variegated cutworm

Application:

May be applied to canola, flax and cereals by air or ground equipment. Ground applications only to peas and potatoes. Apply when insects exceed threshold levels using sufficient water for good coverage.

Suggested water volumes for ground application:

Potatoes - 100 to 340 L per acre

Canola and flax - 40 L per acre

Wheat, oats, barley, peas - 40 to 140 L per acre

When applied by air, pilot should not assist in mixing and loading operations. Apply a mininum of 9 L of water per acre) for aerial application.

Use higher rates for mature insects, dense canopy or when infestations are heavy.

Apply at 5 to 7 day intervals as necessary.

Early morning or late evening sprays are recommended.

How it Works:

Lannate is a carbamate insecticide that works by contact and ingestion and has some systemic action. Rapidly degraded in green, growing plants; short term residual.

Restrictions:

Storage: DO NOT store below 0°C. Store in original container away from other pesticides, fertilizer, food or feed.

Others: DO NOT handle water soluble bags with bare hands. Sprays or drift must not contact workers, other persons or animals. The area being treated must be vacated by unprotected persons.

Precautions:

Lannate is of high acute mammalian toxicity. May be fatal if swallowed, inhaled or absorbed through the eyes. DO NOT breathe dust or spray mist. DO NOT get in eyes, on skin or on clothing.

Toxic to fish, birds and other wildlife. Keep out of any body of water. DO NOT apply where run-off is likely to occur. DO NOT allow to drift from treated areas. Highly toxic to bees exposed to direct application. DO NOT apply to areas being visited by bees. Time applications to coincide with minimum bee activity.

When mixing, loading or applying *Lannate*, wear protective clothing, goggles and an approved respirator. Wear clean clothes daily. Wash thoroughly after handling or applying.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Malathion

Insecticide Group – 1B
(Refer to page 493)

Company:

Loveland Products Canada (*Malathion 85E* – PCP#8372)
IPCO (*Malathion 500* – PCP#5821)

Different companies produce malathion. Note differences in label registrations, formulations and recommendations. Check your label for more information.

Formulations:

Malathion 500 - 500 g/L malathion formulated as an emulsifiable concentrate

Malathion 85E – 85% malathion formulated as an emusifiable concentrate.

Insects Controlled and Registered Crops:

CROP OR STRUCTURE	INSECT
Alfalfa	Grasshoppers, aphids, lygus bugs, alfalfa weevil larvae, leafhoppers, alfalfa blotch leafminer, spider mites, spittle bugs
Clover (85E only)	Aphids, grasshoppers, leafhoppers, spider mites
Canola, mustard	Flea beetles, diamondback moth, grasshoppers
Wheat, barley, oats, rye	Grasshoppers, aphids, armyworm, cereal leaf beetle
Potatoes	Colorado potato beetle, leafhoppers, aphids, spider mites
Canaryseed (for seed) (85E only)	Aphids
Sweet clover	Sweet clover weevil
Flax, lentils, hay, pasture	Grasshoppers
Corn (grain, forage)	Earworms, European corn borers
Beans, peas	Aphids, leafhoppers, spider mites
Empty bin spray (grain bins, grain elevators, grain box cars, flour mills)	Confused flour beetles, flat grain beetles, granary weevils, grain mites, Indian meal moths, lesser grain borers, red flour beetle, rice weevils, rusty grain beetles, saw-toothed grain beetle

Application:

Malathion may be applied by air or ground equipment. Apply when insect numbers exceed economic threshold levels using sufficient water for good coverage. Use higher rates for heavy infestations, dense canopy or mature stages of insects.

How it Works:

Malathion is a non-systemic, contact, organophosphate insecticide and acaricide of brief to moderate persistence. Generally non-phytotoxic.

Effects of Weather:

For best results apply when daytime temperatures are above 20°C.

Restrictions:

Grazing: When spraying forages and pastures, cattle should be removed and returned after spraying.

Storage: DO NOT store near food or feed. Store in a cool dry place but not below -10°C. Protect from heat.

Others: Maximum of 2 applications per season. DO NOT apply to any plant in bloom. Apply to crops when bees are absent from field. Avoid contact with automobile paint and wash immediately if exposure occurs.

Precautions:

Malathion has a low acute mammalian toxicity. Highly toxic to bees and fish. Wear protective clothing to reduce skin and eye exposure.

Hazard Rating:

◈ Warning – Poison

For an explanation of the symbols used here see page 11.

Minecto Duo 40WG

Insecticide Groups – 4 and 28

(Refer to page 493)

Company:

Syngenta Canada Inc. (PCP#30900)

Formulations:

20% thiamethoxam and 20% cyantraniliprole formulated as a wettable granule.

Container sizes – 2 X 3.04 kg jugs

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Aphids, Colorado potato beetle, flea beetles, potato leafhopper

Application:

Minecto Duo can be applied by ground only. Apply by closed cab groundboom only.

Apply as an in-furrow spray at seeding depth or in a narrow surface band above the seedline during planting.

Apply in sufficient in sufficient water volume to ensure uniform application and incorporation into the soil. Add ½ of the required amount of water to the mix tank. With agitator running add the *Minecto Duo* to the tank. Continue agitation while adding the remaining water. Apply one the *Minecto Duo* has completely dispersed into the water mix. Maintain agitation until all the mixture has been applied.

How it Works:

Minecto Duo contains two active ingredients. Both components have systemic (within the plant) properties and interfere with neuro-transmission in insects. Mode of action is through contact or ingestion.

Restrictions:

DO NOT apply by air.

DO NOT use a foliar application of a product containing a Group 4 (neonicotinoid) or Group 28 (diamide) insecticide following in-furrow or soil application of *Minecto Duo.*

Re-entry interval (REI): DO NOT enter or allow worker entry into treated areas for 12 hours.

Storage: Store product in original container only, in a cool, dry place and away from food or feed. Keep container closed.

Precautions:

Avoid application when heavy rain is forecast

Minecto Duo is toxic to aquatic organisms. DO NOT apply this product directly to freshwater habitats

Minecto Duo is toxic to bees. The product is systemic and bees can be exposed to product residues in flower, leaves, pollen and / or nectar resulting from soil applications.

If *Minecto Duo* is to be used on a commodity that may be exported to the U.S. and you require information on acceptable residue levels in the U.S., visit CropLife Canada's website at www.croplife.ca.

Hazard Rating:

◈ Warning – Poison

For an explanation of the symbols used here see page 11.

Movento 240 SC

Insecticide Group – 23
(Refer to page 493)

Company:

Bayer Crop Science (PCP#28953)

Formulations:

Spirotetramat formulated as a suspension concentrate - 240 g/L

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Aphids
Beans, chickpea, lentil, peas, soybean	Aphids

Application:

Ground application only in potatoes and soybeans. Ground or air application for beans, chickpea, lentil and peas. Apply in adequate water for uniform coverage, a minimum of 120 L/ac. If needed repeat application with a minimum of 7 to 10 day interval. DO NOT exceed a maximum of 292 mL / acre per season.

For best results apply when insect populations begin to build and before a damaging population becomes established. Select the appropriate rate depending on the development stage of the insect and level of infestation.

How it Works:

Movento is a systemic, tetramic acid insecticide. Following application to plant foliage *Movento* moves through phloem and xylem to all plant tissues including new shoot, leaf and root growth. Mode of action is primarily by ingestion by immature insect life stages.

Restrictions:

DO NOT apply this product directly to freshwater habitats (such as lakes, rivers, sloughs, ponds, creeks, marshes, streams, reservoirs and wetlands). DO NOT apply during periods of dead calm. Avoid application when winds are gusty. DO NOT apply droplets smaller that American Society of Agricultural Engineers (ASABE) fine classification. Boom height must be 60 cm or less above ground.

Re-Entry: DO NOT enter or allow worker entry into treated areas for a period of 12 hours.

Re-cropping: A plant back interval of 30 days is required for all crops not on the label.

Precautions:

Movento is toxic to bees through direct contamination of pollen and nectar. DO NOT apply this product during crop flowering period or when flowering weeds are present in the field.

Hazard Rating:

☠ Caution – Poison

For an explanation of the symbols used here see page 11.

Nolo Bait

Company:

M&R Durango, Inc. (PCP# 29197)

Formulations:

Wheat bran coated with spores of the protozoan *Nosema locustae*.

Minimum of $2.2x10^6$ spores of *Nosema (Paranosema) locustae* Canning per gram.

Insects Controlled and Registered Crops:

CROP	INSECT
Crop and Rangeland	Grasshoppers

Rates:

Apply at a minimum rate of 0.45 kg per acre.

Consumption of a higher number of spores per grasshopper will increase product efficacy and decrease the amount of time required to kill grasshoppers. Where greater efficacy or faster population reduction is required, this may be achieved through multiple applications or a higher application rate to increase the amount of bait available to each grasshopper.

Application:

For best results, apply when most grasshoppers are in the 3rd instar (12 to 19 mm long).

Apply by hand, seed spreader, turbine spreader or airplane. Concentrate the application in areas of heaviest grasshopper infestation.

Insecticide Group – Biological Insecticide

(Refer to page 493)

How it Works:

Nolo Bait must be consumed by the target insect to be effective. It infects the fat bodies of most species of grasshoppers and some crickets. Infection and sickness of the grasshopper begins upon ingestion of the bait by the grasshopper. As the *Nosema locustae* population increases inside the grasshopper it becomes lethargic, reduces its feeding and has lowered reproductive capacity. Grasshopper death will begin in 3 to 6 weeks. The pathogen may remain in the grasshopper population for several years following treatment.

Restrictions:

Preharvest interval: 0

Storage: Store product in original container in a cool, dry location (preferably at or below 20°C). Use within 13 weeks from the date of manufacture.

Precautions:

May cause sensitization. Avoid contact with skin, eyes, or clothing. Avoid breathing dust or spray mist.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Hazard Rating:

⚠ Caution – Potential sensitizer
Wheat allergen

For an explanation of the symbols used here see page 11.

Oberon

Insecticide Group – 23
(Refer to page 493)

Company:

Bayer CropScience Inc. (PCP#28905)

Formulations:

240 g/L spiromesifen formulated as a suspension concentrate
Container size - 2 L jug

Insects Controlled and Registered Crops:

CROP	INSECT
Alfalfa (seed production only)	Two-spotted spider mite
Corn	Banks grass mite, two-spotted spider mite

Application:

May be applied by ground or air.

Apply as soon as mite populations reach threshold levels. Repeat application if pest populations recover and reach economic thresholds. A minimum interval of 7 days between applications is required.

Thorough coverage of all plant parts is important for optimum performance. Use sufficient water volumes for thorough coverage - i.e. minimum of 40 to 80 litres of water per acre.

Avoid application when heavy rain is forecast.

How it Works:

Spiromesifen is in the Tetronic acid class of insecticides and works by contact, inhibiting lipid biosynthesis in the insect. *Oberon* has strong adhesion to the leaf surface, and also some translaminar activity providing residual control through contact or ingestion. *Oberon* has activity on all mite developmental stages. Immature mite stages tend to be more susceptible to *Oberon* than adults.

Restrictions:

Alfalfa – DO NOT exceed 3 applications per season. Keep a minimum interval of 7 days between applications. DO NOT exceed a maximum of 1200 ml per acre of *Oberon* per season. Corn – DO NOT exceed 2 applications per season. DO NOT exceed 240 mL per acre per 14 day interval. DO NOT exceed 480 mL per acre per season.

DO NOT enter or allow entry into treated areas for a period of 12 hours after application.

Oberon is toxic to aquatic organisms and beneficial insects such as pollinators. DO NOT apply this product directly to freshwater habitats such as lakes, rivers, sloughs, ponds, creeks, marshes, streams, reservoirs, ditches and wetlands.

Buffer Zones:

Application method	Buffer Zones (metres [†]) Required for the Protection of:		
	Aquatic Habitats of Depths		Terrestrial habitat
	Less than 1 m	Greater than 1 m	
Ground	10	3	2
Fixed wing airplane	800	100	85

See page 36 for an explanation of the different habitats.

- Buffer zones can be reduced by 70% when using shrouds and by 30% when using cones mounted less than 12 inches from the crop canopy.

[†] Distance measured as metres from the downwind edge of the spray boom to sensitive habitat.

DO NOT mix, load or clean equipment within 30 metres of wellheads or aquatic systems.

Rotational plant-back intervals for:
Field corn – immediate plant back
Wheat, barley and alfalfa – 30 days
All other crops – 12 months

Precautions:

Apply *Oberon* insecticide during pre-bloom, early bloom or late bloom when pollinators are not present in the field. DO NOT apply *Oberon* when pollinators are actively foraging in the treatment area.

Storage: Store in a cool, dry place in such a manner to prevent cross contamination with other pesticides, fertilizers, food and feed.

DO NOT store below freezing.

Hazard Rating:

Caution – Poison

Eye irritant

For an explanation of the symbols used here see page 11.

Orthene

Insecticide Group – 1B
(Refer to page 493)

Company:

Arysta LifeScience North America, LLC (PCP#14225)

Formulation:

75% acephate as a water soluble powder. Container size- case of 12 x 1.5 kg

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Green peach aphid, potato aphid, potato flea beetle, potato leafhopper, tarnished plant bug

Preharvest Interval

DO NOT apply within 21 days of harvest.

Application:

Apply with conventional ground equipment only. DO NOT apply by air.

Apply only when insects exceed economic thresholds.

Use higher rate only for heavy infestations.

How it Works:

Acephate is an organophosphate systemic insecticide that works through contact and as a stomach poison.

Effects of Weather:

DO NOT apply if rainfall is expected within 48 hours after application. Treatment areas should not be irrigated for at least 48 hours after application.

Restrictions:

Storage: Store in cool, dry place, in the original container away from food or feed. Protect from excessive heat.

Environment: *Orthene* has the potential to leach through soils to ground water. It is recommended that *Orthene* is not used on coarse textured soils or in areas where the water table may be high.

DO NOT feed foliage to livestock or allow animals to graze on treated areas.

DO NOT make more than 4 applications per season.

Others: *Orthene* is not registered in the United States. Therefore *Orthene* should not be used on any produce destined for markets in the United States.

Precautions:

Orthene is toxic to birds and mammals.

Orthene is toxic to aquatic invertebrates. DO NOT apply where runoff or drift is likely to occur.

Orthene is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. DO NOT apply this product or allow it to drift to blooming crops or weeds if bees are foraging in the treatment area. Beekeepers should be warned to protect bees from treated areas for one week after treatment.

First Aid:

If swallowed, induce vomiting and obtain medical attention or call a poison control centre immediately. In case of contact with skin, wash with soap and water. If in eyes, flush with water. See a physician if eye irritation persists. Atropine is an antidote.

Hazard Rating:

▽ Caution – Poison

For an explanation of the symbols used here see page 11.

Permethrin

Insecticide Group – 3A
(Refer to page 493)

Company:

FMC of Canada (*Pounce* – PCP# 16688)
United Phosphorous (*Perm-UP* – PCP# 28877)
Amvac Chemical Corporation (*Ambush* – PCP# 14882)

Formulations:

Pounce, Perm-UP - 384 g/L permethrin formulated as an emulsifiable concentrate. Container size – 1 L (12 x 1L).

Ambush - 500 g/L permethrin formulated as an emulsifiable concentrate. Container size - 1 L, 5 L

Insects Controlled and Registered Crops:

CROP	INSECT
Cereals, corn, flax, lentil, pea, potato, sunflowers	Cutworms
Canola, rapeseed	Cutworms, crucifer flea beetle
Potato	Colorado potato beetle, potato flea beetle, potato leafhopper, tarnished plant bug, variegated cutworm, European corn borer

Application:

Permethrin may be applied by ground or air. Apply when insects exceed economic threshold numbers and use sufficient water for good coverage. Use higher rates for heavy infestations, adult insects and dense foliage. For cutworm control application should be made under warm, moist conditions in the evening or at night. Use high rates if larvae are near maturity or soil conditions are dry. Do not disturb soil surface for five days after treatment.

How it Works:

Permethrin is a synthetic pyrethroid insecticide. It is a stomach and contact insecticide with no systemic or fumigant effects.

Restrictions:

Grazing: Cover crops or crops treated with permethrin should not be used as a green feed for animals.

Storage: Store above 0°C.

Others: Observe a 16 yard (15 m) setback distance for ground and 110 yard (100 m) setback distance by air near water bodies or other sensitive areas.

Precautions:

Permethrin is of low acute mammalian toxicity. Permethrin is very toxic to bees and fish. DO NOT contaminate ponds, lakes or streams while filling sprayer or spraying. Avoid spraying when bees are foraging.

Hazard Rating:

Caution – Poison

For an explanation of the symbols used here see page 11.

Rimon 10 EC

Insecticide Group – 15
(Refer to page 493)

Company:

Platform Specialty Products (PCP# 28881)

Formulations:

10% novaluron formulated as an emulsifiable concentrate

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle, European corn borer

Application:

For ground application only.

A minimum spray volume of 40 L / acre should be used with ground sprayer equipment. Higher water volumes will provide better coverage and product performance.

Use hollow cone, disc-core hollow cone or twin jet nozzles suitable for Insecticide spraying. Drop nozzles may be required to obtain uniform coverage against certain insect pests that develop down in the canopy. Use higher application rates and spray volumes for higher insect pressure.

Colorado potato beetle - Application should be made when the majority of the population is at egg hatch to the second instar of larval development.

European corn borer - Scout for European corn borer to monitor egg-laying and egg hatch to determine timing of application. The first application should be made just prior to egg hatch.

Re-application on a 10 to 14 day interval will be required to protect new growth or if monitoring indicates that it is necessary to keep pest populations below economic thresholds.

How it Works:

Rimon 10 EC is an insect growth regulator that must be absorbed by eggs or ingested by insect larvae to be fully effective. The primary mode of action is by disrupting cuticle formation and deposition occurring when insects change from one developmental stage to another, resulting in death at molting. Due to this mode of action *Rimon 10EC* does not have any effect on adult stages of insects that have completed larval development.

Restrictions:

DO NOT make more than 2 applications per year per crop per season.

DO NOT apply more than 656 ml of *Rimon 10 EC* per acre per season.

DO NOT apply within 14 days of harvest (Preharvest interval).

Precautions:

DO NOT re-enter treated areas for a period of 12 hours after application.

Rimon 10 EC is toxic to aquatic organisms. DO NOT apply *Rimon 10 EC* directly to water or to areas where surface water is present. An untreated buffer zone between the last spray swath and the edge of aquatic systems (such as rivers, streams, lakes, and other water bodies) must be established. Refer to label for specific buffer zone requirements.

Rimon 10 EC is toxic to immature insects. Minimize spray drift in habitats next to the application site (e.g. hedgerows and wood- lands) to reduce harmful effects on beneficial insects.

Rimon 10 EC may be toxic to bee colonies exposed to direct treatment, drift or residues on flowering crops or weeds.

Avoid applying this product to flowering crops or weeds if bees are visiting the treatment area.

Storage: To prevent contamination, store this product away from food or feed.

If this product is to be applied to a product destined for export to the United States, information on acceptable residue levels are available at www.croplife.ca

Hazard Rating:

⚠ Warning - May cause substantial but temporary eye injury. Harmful if absorbed through skin. DO NOT get on eyes or clothing.

Keep out of Reach of Children.

For an explanation of the symbols used here see page 11.

Sevin XLR Plus

Insecticide Group – 1A
(Refer to page 493)

Company:

Tessenderlo Kerley, Inc. (PCP#19531)

Formulation:

480 g/L carbaryl formulated as a liquid suspension

Insects Controlled and Registered Crops:

CROP	INSECT
Canola	Flea beetles
Alfalfa, clover	Grasshoppers, blister beetles, leafhoppers, alfalfa caterpillar, armyworm
Barley, oats, rye,	Armyworm, grasshoppers
Beans	Leafhoppers, lygus bugs, climbing cutworms
Ditchbanks, field borders, forage grasses, headlands, pastures, rangelands, rights-of-way, wastelands	Grasshoppers
Corn	European corn borer, corn earworm, fall armyworm, grasshoppers
Potato	Colorado potato beetle, flea beetle, leafhopper, European corn borer, climbing cutworms

Application:

May be applied by air or ground equipment. Apply when insect numbers exceed economic threshold levels and use sufficient water for good coverage. Use lower rates on young plants and early stages of insects and higher rates on mature plants and advanced stages of insects, or mature insects.

Sevin XLR Plus applications are more resistant to wash-off when applied as a concentrated suspension. To ensure wash-off resistance is retained, apply dilutions of 1 part *Sevin XLR Plus* to no greater than 39 parts water. For example, if applying 1 L/ac of *Sevin XLR Plus* DO NOT exceed 40 L/ac total application volume. Applications should be made to dry foliage to maximize wash-off resistance.

How it Works:

Sevin XLR Plus is a carbamate insecticide that works by contact (approx. 20%) and ingestion (approx. 80%). Moderate to rapid in speed of action with short to moderate residual activity (2 to 4 weeks).

Restrictions:

Storage: DO NOT store in areas where temperatures frequently exceed 38°C. Store in original container in a cool dry area out of reach of children and animals and away from food and feed.

Grazing: Remove cattle from area when spraying. Crops may be grazed or harvested for feed: Dairy animals - 48 hours after treatment; Meat animals - 24 hours after treatment.

Precautions:

Sevin XLR Plus is of moderate acute mammalian toxicity. This product is highly toxic to honeybees exposed to direct treatment on blooming crops or weeds. Harmful if inhaled or swallowed. Avoid contact with skin and eyes. Wear long-sleeve work clothing and change to clean clothing daily. Wash hands and face after handling. Avoid contamination of food, feed, water supplies, streams and ponds.

Hazard Rating:

☠ Warning – Poison

For an explanation of the symbols used here see page 11.

Sluggo Professional

Molluscicide – no group

Company:

Engage Agro Corporation (PCP# 30025)

Formulation:

0.76 % ferric phosphate in a granular formulation

Container size - 5, 25 kg bags

Pest Controlled and Registered Crops:

CROP	INSECT
Field crops	Slugs and snails

Rates:

Apply bait evenly at a rate of 4.9 to 20.2 kg / acre (1.2 to 5 g per square metre).

Application:

Apply in the evening as slugs and snails travel and feed mostly at night or early morning. DO NOT place in piles. For best results the ground should be moist but with little or no standing water.

For broadcast application, standard broadcast spreaders may be used. For row application, standard granular spreaders may be used.

At seeding and later stages, apply the bait between rows and around the perimeter of the field. Treating around the perimeter of crop areas may intercept slugs or snails migrating from daytime refuge sites.

Apply at the higher rate within the recommended rate range if the infestation is severe, if the area is heavily watered or after long periods of heavy rain.

Re-apply as the bait is consumed or at least every two weeks if slugs and snails continue to be a problem.

How it Works:

Sluggo must be consumed by the slugs or snails to be effective. After ingesting the bait, slugs and snails stop feeding providing immediate protection to plants. Affected slugs and snails die within 3 to 6 days.

Restrictions:

Avoid direct application to ponds streams and lakes. This product may be toxic to fish and other aquatic organisms.

Precautions:

Avoid contact with eyes. May cause eye irritation.

Wear chemical resistant gloves during mixing and loading activities and when applying by hand.

Hazard Rating:

⚠ Warning – contains the allergen wheat

For an explanation of the symbols used here see page 11.

Success 480 SC

Insecticide Group – 5
(Refer to page 493)

Company:

Dow AgroSciences (PCP#26835)

Formulation:

480 g/L spinosad formulated as a suspension concentrate

Container size - 1L jug

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Colorado potato beetle lavae and European corn borer larvae

Application:

Apply *Success 480 SC* as a foliar spray by ground only. DO NOT apply by air. Apply when scouting indicates the target pest species have reached economic threshold levels. For Colorado potato beetle, target eggs at hatch or small larvae. For control of European corn borer, time the application to coincide with peak egg hatch. Use higher application rate for higher pest pressure or when extended egg hatch is anticipated. If pest populations persist, a repeat application 7 to 10 days after the initial application may be necessary.

How it Works:

Success 480 SC is in the spinosyn class of insecticides. It is a contact and stomach insecticide. It is derived from the fermentation of *Saccharpolyspora spinosa.*

Effects of Weather:

This product has the potential for run-off. DO NOT spray immediately after a rainfall or if rain is forecast within 48 hours after application.

Restrictions:

Storage: Avoid freezing. DO NOT store or ship with food, feeds, drugs or clothing.

Others:

Potatoes - DO NOT apply more than a maximum seasonal rate of 100 ml/acre.

DO NOT apply within 7 days of harvest.

DO NOT enter or allow worker entry into treated areas for a period of 4 hours after application.

Precautions:

Success 480 SC is highly toxic to honey bees exposed to direct spray. Avoid spraying on crops in bloom or other vegetation when bees are actively foraging. This product is toxic to other beneficial parasites and predators. DO NOT contaminate aquatic habitats such as ponds, lakes, rivers, streams and wetlands during application or when rinsing equipment and containers.

Buffer Zones: A buffer zone of 2 metres (early season) or 1 metre (late season) is required between downwind edge of spray boom and sensitive aquatic habitats. Avoid contact with eyes, skin, and clothing.

Hazard Rating:

▽ Caution – Poison

For an explanation of the symbols used here see page 11.

Superior 70 Oil

Insecticide Group – NA
(Refer to page 493)

Company:

Loveland Products Canada Inc. (*Superior 70 Oil* – PCP#14981)

N.M. Bartlett Inc. (*Superior "70" Oil* – PCP# 9542)

Formulation:

Mineral Oil, 99%. emulsifiable concentrate

Container size – 10 L, 200 L and 1000 L

Pest and Registered Crop:

CROPS:	PEST	APPLICATION TIMING:
Potato	Reduce the spread of Potato Virus Y (PVY) transmitted by aphids	Max – 10 applications when aphids first appear; Pre-harvest interval: 14 days.

Application:

Ground application only. DO NOT apply by air.

DO NOT use the spray mixture before the oil has been properly emulsified.

Spray at one week intervals as soon as aphid vectors are present.

Thorough coverage of the plants is essential. Apply at a 10% rate (e.g. 10L per 1000L water).

Boom height must be 60 cm or less above ground or crop canopy.

How it Works:

The mineral oil reduces the spread of potato virus Y (PVY) disease vectored by aphids. The mineral oil does not kill the aphids.

Tank Mixes:

None registered. Do not mix with dinitro compounds, fungicides such as Captan, Maestro, Folpet, Karathane, Morestand, Wettable Sulphur or any other product containing sulphur, or the insecticide Sevin.

Effects of Weather:

Avoid application when heavy rain is forecast.

DO NOT apply on drought stressed plants, in hot sun or when there is a risk of freezing temperatures.

DO NOT apply during periods of dead calm. DO NOT apply when winds are gusty or wind speed is greater than 16 km/h.

Restrictions:

Maximum number of applications: 10 per season

Re-entry: Do not re-enter treated areas within 12 hours of application.

Pre-harvest interval: 14 days

Storage: Store in original tightly closed container in a cool dry, well-ventilated area away from feed and foodstuffs. DO NOT store below 0°C.

Precautions:

DO NOT use within 30 days before or after using Sulfur.

Avoid run-off from treated areas into aquatic areas, since product is not registered for aquatic pest control. Avoid application when heavy rain in forecast.

Hazard Rating:

☠ Danger – Poison, Eye irritant

For an explanation of the symbols used here see page 11.

Thimet 20G

Insecticide Group – 1B
(Refer to page 493)

Company:

Amvac Chemical Corporation (PCP# 29000)

This product is ONLY for retail sale to and use by individuals holding an appropriate provincial pesticide applicator certificate or license.

Formulations:

20% phorate formulated as a granular.
Container size- 20 kg bag.

Insects Controlled and Registered Crops:

CROP	INSECT
Potato	Reduction of wireworm damage.

Application:

Ground application only at seeding time: This is a restricted product and can only be applied with a *SmartBox* pesticide application system properly calibrated to ensure accurate placement and rate. Distribute granules evenly in furrow at planting time only. Use low rate for sandy or light soils and high rate for silt or heavy soils. For use ONLY in potato fields where wireworm populations have been observed.

How it Works:

Phorate is an organophosphate insecticide that works as a systemic poison, with effective initial residual activity on soil and foliar insects.

Restrictions:

DO NOT apply *Thimet* more than once per season.

DO NOT apply *Thimet* to saturated soils or in wet conditions that may prevent the equipment from covering pesticide granules. DO NOT apply while precipitation is occurring and conducive to run-off from treated areas. DO NOT apply if intense or sustained precipitation is forecast to occur within 48 hours as this will favour run-off.

Leave a 20 metre (66 feet) buffer area if used on highly erodable land adjacent to aquatic bodies.

DO NOT apply within 15 metres (50 feet) of any drinking water well.

Storage: DO NOT store in or around the home. Store away from food or feed. Store open bags in labeled sealed drums or heavy plastic bags.

Others: DO NOT use in muck soils. DO NOT apply later than at planting time. Will provide reduction of wireworm damage.

DO NOT use on muck soils.

A plant-back interval of 6 months is required for all crops except potatoes and legume is required. A plant-back interval of 12 months is required for legume vegetables. There is not plant back restriction for potatoes.

DO NOT enter or allow workers to enter into treated areas for a period of 48 hours.

DO NOT harvest potatoes before 90 days after planting time.

Precautions:

Thimet is of high acute mammalian toxicity and is highly toxic to fish, birds and other animals. DO NOT allow product to contact eyes and skin. Poisonous by skin contact, inhalation or swallowing. DO NOT breath dust. Repeated inhalation or skin contact with *Thimet 20G*, other organophosphorus or carbamate insecticides may, without symptoms, progressively increase susceptibility to poisoning. Wear freshly-laundered, long-sleeved work clothing daily. DO NOT handle *Thimet* with bare hands. Use rubber gloves when transferring from package to equipment. Sleeve cuffs should be worn over gloves to prevent granules from falling into the gloves. Rubber gloves should be washed with soap and water after each use. Destroy and replace gloves frequently. In case of contact, immediately remove contaminated clothing and wash skin thoroughly with soap and water.

Hazard Rating:

☠ Danger – Poison

For an explanation of the symbols used here see page 11.

Voliam Xpress

Insecticide Group – 3, 28
(Refer to page 493)

Company:

Syngenta Canada Inc. (PCP# 30325)

Formulation:

50 g/L lambda-cyhalothrin and 100 g/L chlorantraniliprole formulated as a suspension concentrate

Container size:

Insects Controlled and Registered Crops:

CROP	INSECT
Bean, chickpea, fababean, lentil, pea, soybean	Aphids, armyworms, cabbage looper, corn earworm, European corn borer
Canola, rapeseed, mustard (seed and condiment), sunflower	Bertha armyworm, cabbage looper, cabbage seedpod weevil, imported cabbageworm, diamondback moth, flea beetles, Lygus bugs, sunflower beetle
Corn	Armyworm, corn earworm, European corn borer
Potato	Cutworms, corn earworm, beet armyworm, leafminers, psyllids

Application:

Voliam Xpress may be applied by ground or air.

Timing of applications should target the pest and when populations are in a damaging life stage and at economic levels.

Ensure adequate water volumes are used for optimum coverage.

Potatoes and Corn –
Ground – Apply in a minimum of 60 L of water per acre.
Air – Apply in a minimum of 16 L of water per acre.

Bean, chickpea, fababean, lentil, pea, soybean, canola, rapeseed, mustard (seed and condiment), sunflower - Apply when insect feeding is first seen on foliage. Reapply after 7 days if populations reach economic threshold levels.
Ground – Apply with a minimum of 40 – 80 L water per acre.
Air – Apply with a minimum of 16 L of water per acre.

How it Works:

Voliam Xpress insecticide works through contact and ingestion. It provides rapid knockdown and residual control of Lepidopteran (e.g. moth larvae) and sucking and chewing insects. After foliar application most of the insecticide stays on the leaf surface with a small amount penetrating into the leaf tissue. Initial and residual control is dependent on thorough coverage of the crop. *Voliam Xpress* is most effective against early developmental stages of surface feeding insects and adults of pest that deposit eggs within plant parts. Insecticide components: lambda-cyhalothrin is a synthetic pyrethroid insecticide and chlorantraniliprole is a diamide insecticide.

Restrictions:

DO NOT apply *Voliam Xpress,* which contains a group 28 insecticide, following a seed piece, in-furrow, or soil application of any group 28 insecticide.

Bean, chickpea, lentil, pea, soybean –

Ground – DO NOT apply more than 3 times per season

Air – DO NOT apply more than once per season.

DO NOT graze or harvest treated forage, straw or hay for livestock feed.

A 7 day interval is required between applications.

Pre-harvest interval – 14 days except - Soybean pre-harvest interval – 21 days.

DO NOT exceed the following amount of product per season. This includes *Voliam Xpress* as well as other Group 3 and / or Group 28 insecticides. Consult the label of other products containing these active ingredients prior to treatment to ensure the annual maximum is not exceeded:

- 90 g chlorantraniliprole per acre by ground or aerial application and;
- 30 g lambda-cyhalothrin per acre by ground application or;
- 10 g lambda-cyhalothrin per acre by air

Canola, rapeseed, mustard (seed and condiment), sunflower –

Application interval – 7 days

Pre-harvest interval - 7 days

Make only 1 application per season by either ground or air for cabbage seedpod weevil.

DO NOT make more than 3 applications per season by ground application

DO NOT make more than 1 application per season by air

Corn –

DO NOT make more than 2 applications of *Voliam Xpress* per year.

Application interval – 7 days

Pre-harvest interval – 14 days if crop is harvested for silage and 21 days for field corn

DO NOT exceed - 90 g chlorantraniliprole per acre by ground or aerial application and;

- 27.6 g lambda-cyhalothrin per acre by ground application or;
- 20 g lambda-cyhalothrin per acre by air

Potato –

DO NOT make more than 2 applications of Voliam Xpress per year.

Application interval – 7 days

Pre-harvest interval – 7 days.

Buffer Zones: – The buffer zones specified in the table below are required between the point of direct application of Voliam Xpress and the closest downwind edge of sensitive freshwater habitats (e.g. lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands). Spray drift buffer zones can be modified based on weather conditions and spray equipment.

Method of Application	**Crop**	**Freshwater habitat Less than 1 metre**	**Freshwater habitat Greater than 1 metre**
Ground sprayer	Corn, potato, canola, mustard, sunflower	15	15
Aerial (fixed wing)	Corn, potato	225	25
Aerial (fixed wing)	Bean, chickpea, fababean, lentil, pea, soybean	100	15
Aerial (fixed wing)	Canola, mustard, Sunflower	45	10

Precautions:

DO NOT apply during periods of dead calm or when winds are gusty.

Avoid application at temperatures above 25 degree C. Control of insects may be reduced at higher temperatures.

DO NOT enter or allow entry into treated areas for a period of 24 hours after application of *Voliam Xpress*.

This product is highly toxic to bees exposed to direct treatment or residues on flowering crops or weeds. Do not apply this product or allow it to drift to flowering crops or weeds if bees are visiting the treatment area.

Voliam Xpress is highly toxic to fish and other aquatic organisms. Do not allow spray drift to come in contact with lakes, streams, rivers, ponds or other aquatic areas including marshes, ponds, ditches, streams, lakes, etc. Do not apply *Voliam Xpress* where runoff is likely to occur and be hazardous to aquatic organisms in neighboring areas.

If *Voliam Xpress* is to be applied to a commodity destined for export to the United States, visit Crop Life Canada's web- site www.croplife.ca for information on acceptable residue limits.

Storage: Do not use or store in or around the home. Store unused product away from feeds, seeds, fertilizer, plants and foodstuffs. *Voliam Xpress* must be stored above freezing.

Hazard Rating:

☠ Danger – Poison

Potential skin sensitizer.

For an explanation of the symbols used here see page 11.

Notes